MAY 1974

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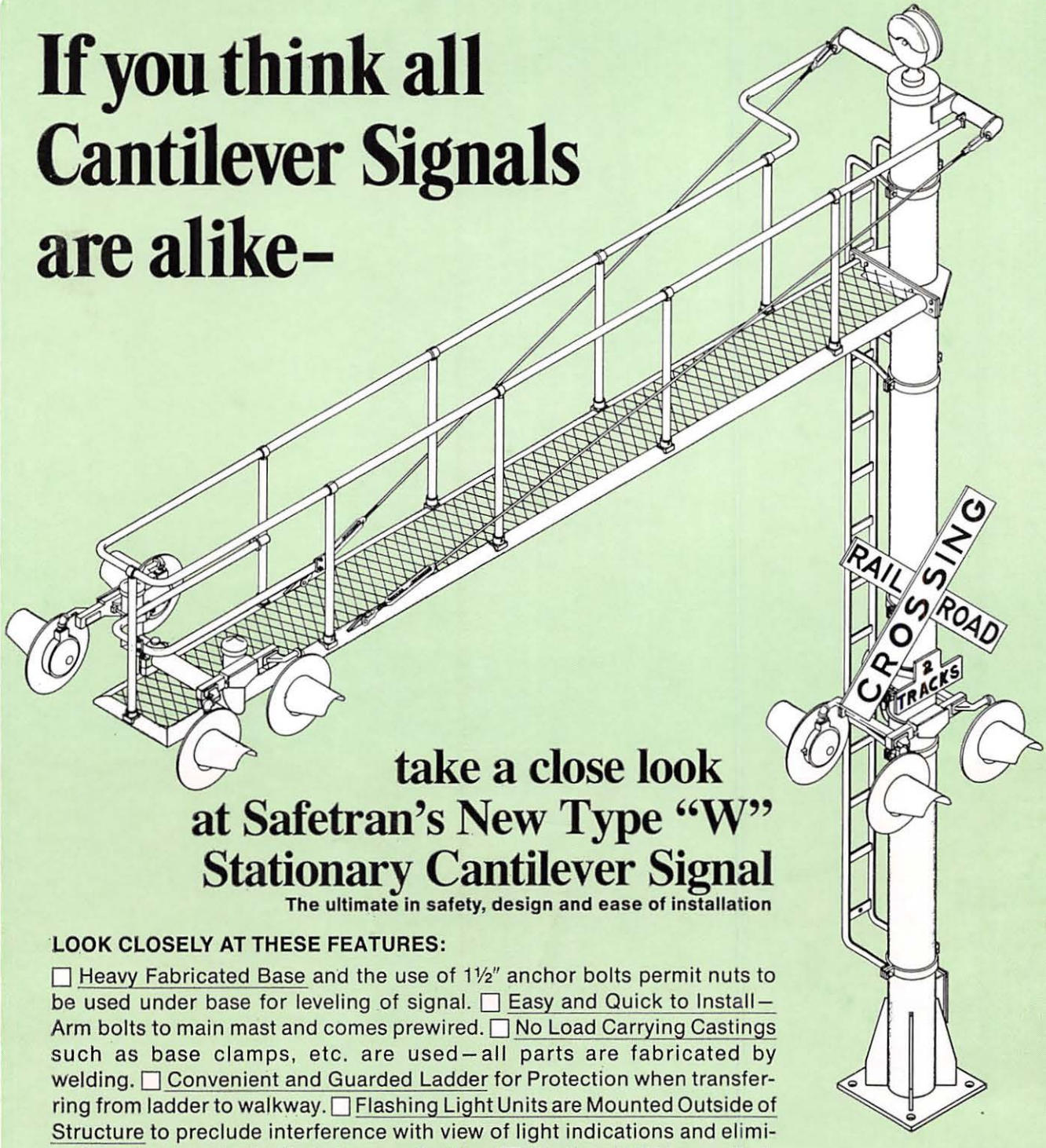

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RSC RAILWAY SYSTEM CONTROLS

(Formerly Railway Signaling & Communications)

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RSC News

John W. Ingram, FRA

Conference on Crossing Safety to be held in Colorado Springs

The U.S. Department of Transportation's Federal Railroad and Federal Highway Administrations have announced the fifth National Conference on Rail-Highway Crossing Safety will be held Aug. 19-21, 1974, at the U.S. Air Force Academy in Colorado Springs, Colo.

"The purpose of these meetings is to provide an open forum whereby all interested parties can exchange ideas and information on methods of implementing grade crossing improvements," Federal Railroad Administrator John W. Ingram and Federal Highway Administrator Norbert T. Tiemann said.

"The problem has been with us ever since railroads were invented. Cooperation between the various Federal, State and local government bodies as well as with the private sector greatly enhances our ability to forge the tools needed to implement effective national grade crossing improvement programs," they said.

Prior conferences helped to lay the groundwork for the types of programs needed to reduce the number of accidents at grade crossings. The upcoming conference will direct its attention to methods of implementing the programs.

Topics to be discussed at the three-day conference include: priority programs for grade crossing improvement; tools available for establishing these programs; urban rail relocation projects; and new developments in rail-highway grade crossing programs.

The conference is sponsored by DOT in cooperation with the Highway Research Board, the National Safety Council, the National Association of Railroad Utility Commissioners, Association of American Railroads, and the American Association of State Highway and Transportation Officials. Participants at the conference will include representatives from the above agencies, as well as railroad labor, equipment suppliers, individual railroads, the academic community and various local government agencies.

FRA will use computer for high speed test center

The Department of Transportation's Federal Railroad Administration announced award of a $1.7 million contract for a computer network that will control the test simulator in the Vehicle Dynamics Laboratory now under construction at DOT's High Speed Ground Test Center at Pueblo, Colo.

The computer system, to be developed by Datacom, Inc., of Fort Walton Beach, Fla., will be an integral part of a major research effort to learn more about vehicle/rail interaction. The dynamics simulator will be used to reproduce the complex motions associated with moving rail vehicles. Under computer control, the device will become a large, vibrating test stand permitting simulation of rolling stock speeds from the very low up to 285 miles per hour. The simulator will permit experiments on suspension systems, wheel-rail adhesion, causes of derailment, and ride quality on controlled and scientific bases.

Construction was begun on the Vehicle Dynamics Laboratory Building in 1972 and work will be completed this spring. The 60,000 sq. ft. structure will house the world's most sophisticated rail rolling stock test facility. It will be equipped with suitable apparatus and instrumentation for testing full scale railroad rolling stock and related equipment performing in a programmed environment.

The facility will be available for initial experimentation this year.

Transport-Expo will focus on leading techniques in surface transportation

Transport-Expo, to be held April 15-20, 1975, in Paris, France, will display the most up-to-date equipment with components and fittings, which are in service, under test or at the design stage, regardless of the technology involved.

Most countries are planning considerable investment programs on railways and other means of transport. Transport-Expo 1975 will therefore highlight all aspects of modernization and innovation regarding surface transport.

Since 1975 will be the 150th anniversary of the world's first passenger train, which ran between Stockton and Darlington, England, particular attention will be given to guided forms of transport, rolling stock and track equipment.

Following are the five areas to be explored:

- guided forms of transport
- road transport (other than the conventional private car)
- transport by sea and inland waterway
- transport by pipeline
- other surface transport facilities: amphibious, mixed type, systems for soft ground, systems without infrastructure, etc.

Within these five sections, leading constructors will be able to display their products in accordance with the needs of:

- technological innovation
- modern operating methods
- environmental considerations
- improved spatial planning

Through a far-reaching exchange of information on experience, performance data and technical results, the International Biennial Show, Transport-Expo, is hoped to meet a long-felt need on the part of the industry and governments.

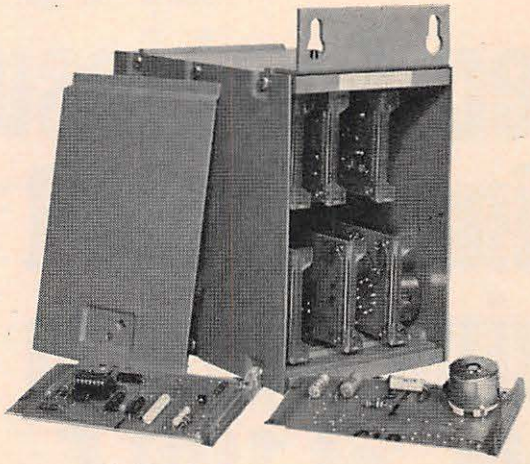
Relocation is huge job for CP Telecommunications

One of the most complicated moving operations—involving 400 people, plus 100 tons of communications equipment and 250,000 miles of wiring—awaits Canadian Pacific Telecommunications when it relocates to new headquarters in Montreal.

"We are facing an expansion of telecommunications in Canada, and the new building will help us meet the increasing demand for our services," said R. T. Riley, vice-president transport & telecommunications, Canadian Pacific Limited, at the ground-breaking ceremony March 19. The new building will be called Edifice CP Telecommunications, on Notre Dame West. CP Telecommunications will occupy six floors of the 15-story building, which will be ready by mid-1975. But it will

NEW
SERIES FREQUENCY SHIFT OVERLAY TRACK CIRCUITS

Series FSO Module.



Module with frequency determining boards removed.

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Precise tuning - narrow band widths and 330-Hz modulation provide precise tuning with minimum interference.

Choice of 3 frequencies - 13.8 KHz (channel 25), 17.0 KHz (channel 26), 20.9 KHz (channel 27) - mutually compatible, enabling transceivers to operate in close proximity without interference or the need of insulated joints.

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FSO compatible - all three channels are compatible with all GRS frequency shift overlay frequencies and most older type overlay track circuits.

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Compact - the transceiver occupies the space of a GRS Type B, Size 2 relay — 5 inches wide, 7 inches high, and 9 inches deep. It can be shelf, wall, or rack mounted in a wayside case or housing.

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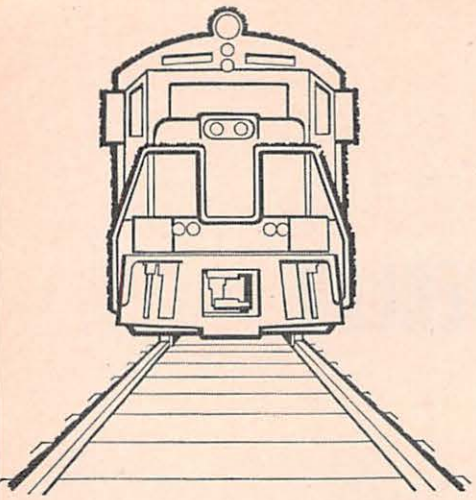

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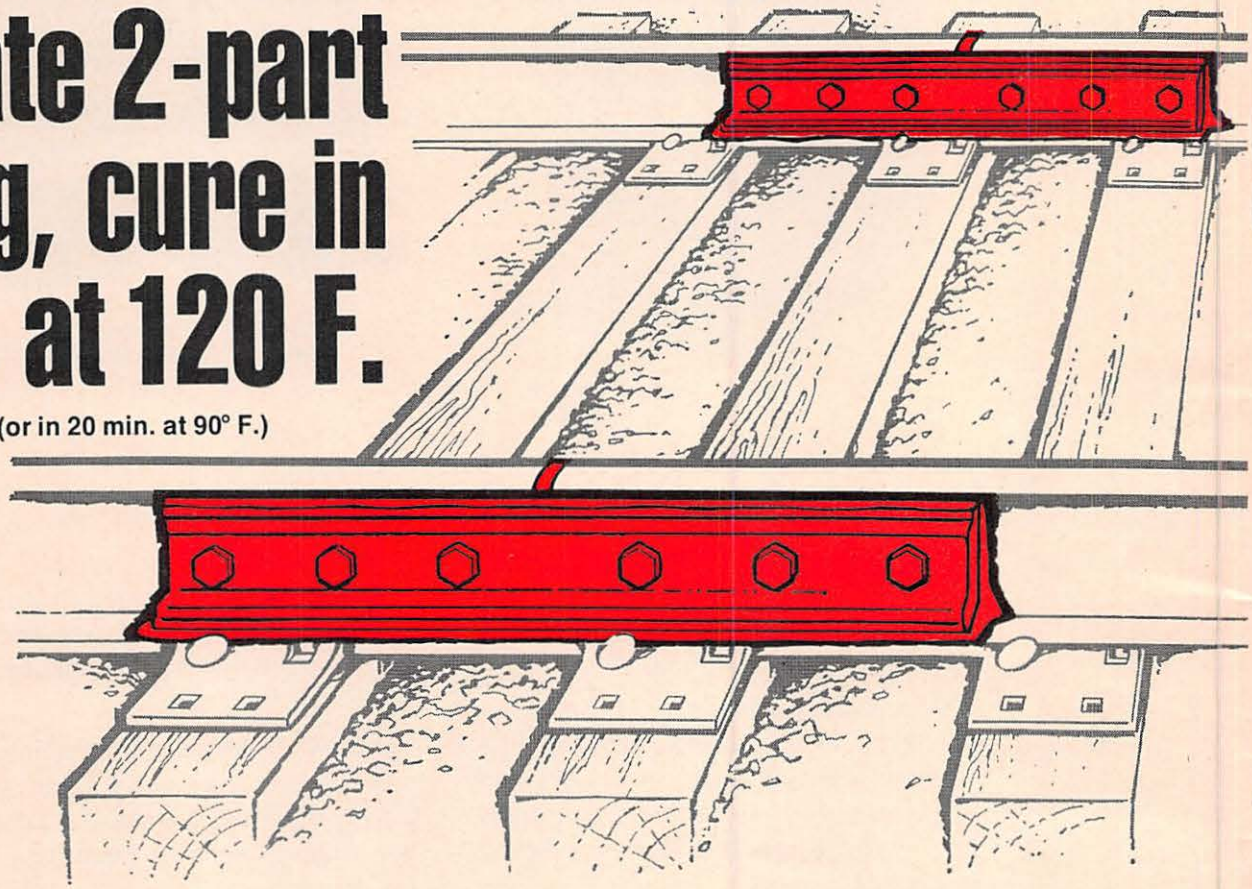
(or in 20 min. at 90° F.)



See your Portec man for details. Or contact:

PORTEC inc.

300 Windsor Drive
Oak Brook, Illinois 60521
Telephone: 312-325-6300

In Canada:
PORTEC Ltd.
500 Dominion Square Bldg.
Montreal, Quebec H3B1G4
Telephone: 514-866-9368

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Make Tracks with the Leader

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RSC News

(continued from page 4)

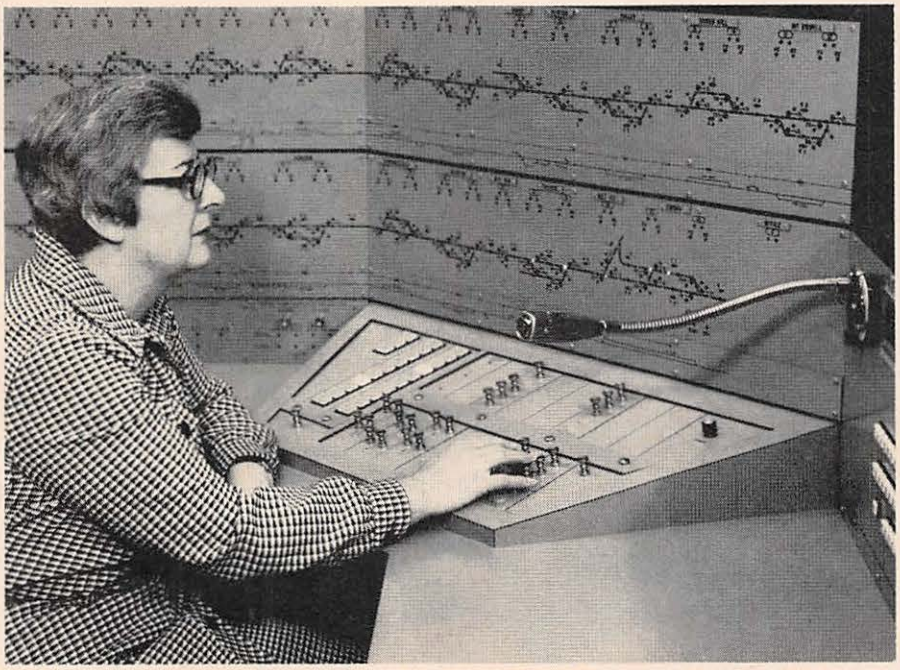
take 40 technicians, supported by a team of engineers and planners, until 1979 to complete relocation from the company's four separate locations in Montreal.

"It's mind-boggling in the detail involved," said D. N. MacLeod, general manager, CP Telecommunications. "As one piece of equipment is moved its function will be transferred to another, because transmission on our networks must be maintained without interruption during the move."

Montreal is an important part of the trans-Canada communications system of the company. It is the gateway to the Maritimes, the U.S. and Europe. On any one day, the Telex network alone accounts for 50,000 messages routed to the world's 200,000 Telex subscribers. As well as Telex, there are thousands of subscribers who lease circuits for data-transmission and access to computers, teletype services to news wires and broadcast services to radio and television stations.

It is estimated that the rapid growth of telecommunications in years to come will require transmission capabilities five times today's volume, even though miniaturization of communications equipment will be a feature of the 'communications explosion' forecast by technology experts.

CP Telecommunications operates as a department within Canadian Pacific Limited. CP Telecommunications is also in partnership with Canadian National Telecommunications, which operates as a department of the Canadian National Railway Company. CPCN Telecommunications together supply nationwide telecommunications services through their own cross-country data transmission facilities.



Mary Aldrich, Engineering Project Manager, WABCO, conducts a final check of a railroad traffic control center destined for the SCL at Atlanta, Ga.

WABCO supplies signal equipment for Seaboard Coast Line

The Union Switch & Signal Division of WABCO has received an order from the Seaboard Coast Line for engineering design, factory-wired control office and field logic systems, and wayside signal equipment for installation between Atlanta, Ga., and Hamlet, N.C., a distance of 322 miles.

Control office equipment will include a WABCO Traffic Control Center with a 'System 600' which will be combined with existing relay code systems to direct train movements between Emory, Ga., and Monroe, N.C., a distance of 263 miles.

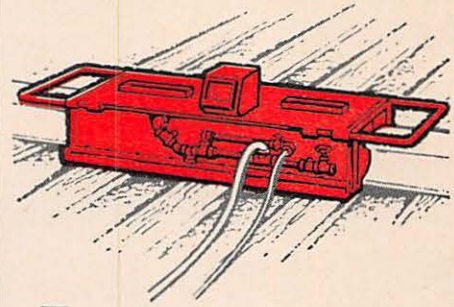
The newly available WABCO 'System 600' equipment is specially designed to provide a modern, solid-state integrated circuit, programmable control system for Centralized Traffic Control projects.

Factory-wired field logic systems and wayside signal equipment are also being furnished for installation between Hamlet, N.C., and Dover, S.C., and between Abbeville, S.C., and near Auburn, Ga.

NEW...

The Portec Model 75 Portable Bonded Rail Joint Heater.

(For those who need heat.)



Faster, lower-cost curing of any bonded joint... with instant temperature read-out gauge.

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And it's small enough to carry in a car trunk.
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PORTEC

Oak Brook, Illinois
Montreal, Quebec

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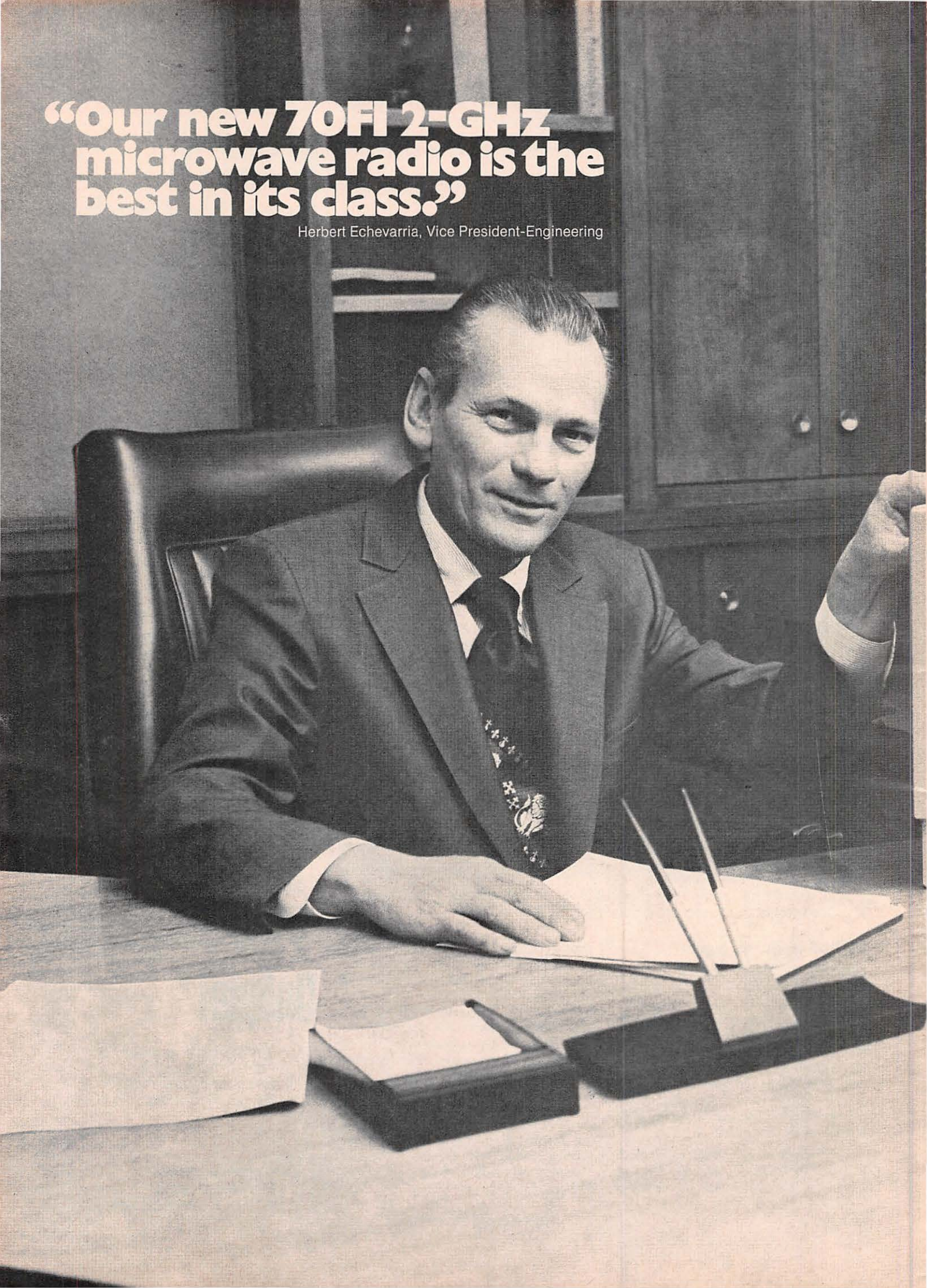
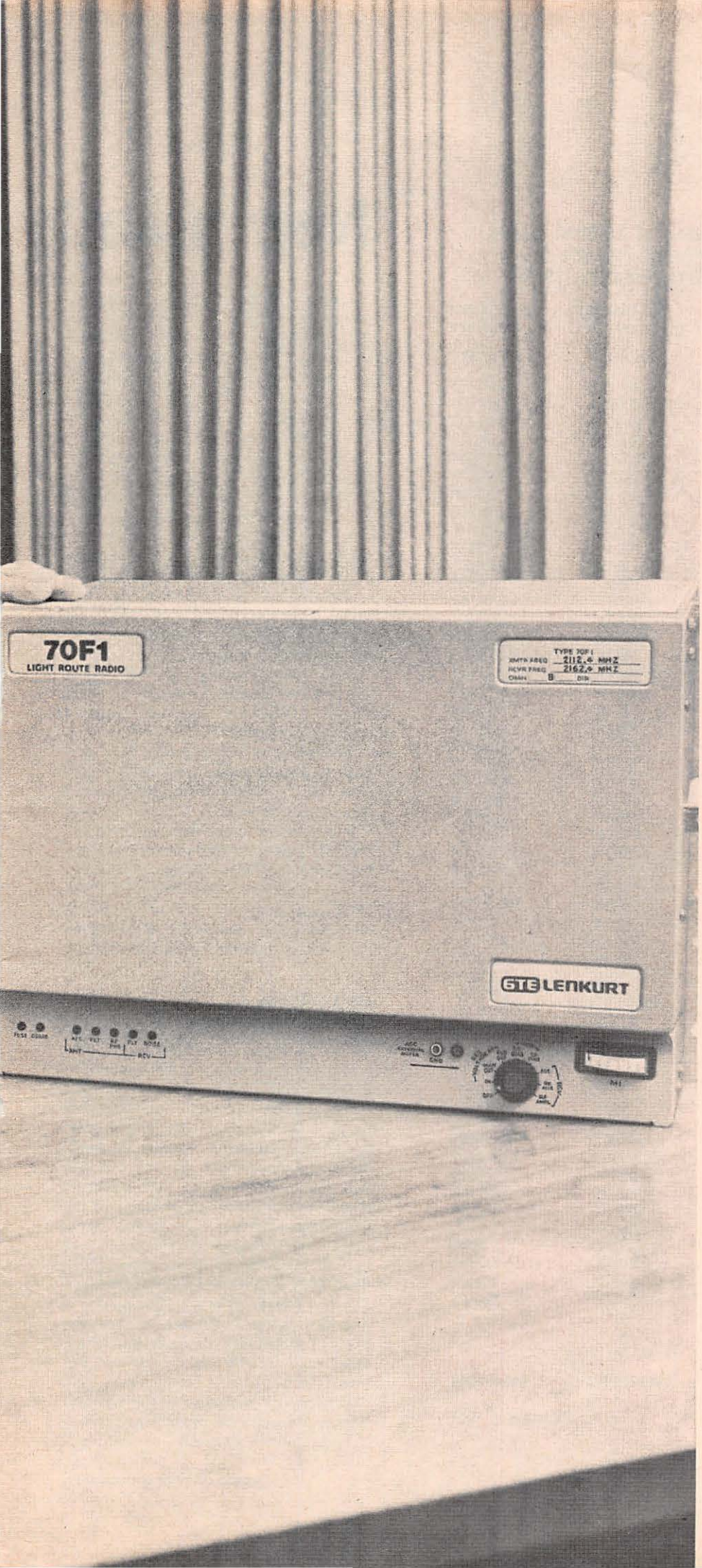

"Our new 70FI 2-GHz microwave radio is the best in its class."
Herbert Echevarria, Vice President-Engineering



Here are the numbers to back us up:

Channel capacity	36
Baseband Frequency Range: Message Order Wire & Supervisory	 12 kHz-156 kHz 300 Hz-8 kHz
RF power output	+30 dBm
Frequency stability	0.001%
Noise performance at normal RF level	26.5 dBrnc0
Receiver noise figure	6.5 dB
Size: Height Width Depth	 12¼ inches 17½ inches 14½ inches
Weight	35 lb.

We started out to build a low-priced narrowband radio for thin-route industrial and common carrier communications.

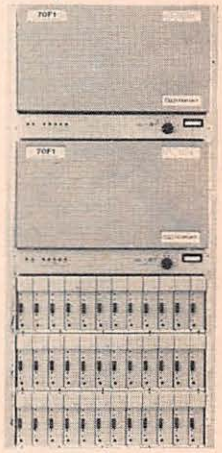
We succeeded beyond our greatest expectations.

Right down the line our 70F1 checks out for price, size and overall performance. It's solidly the best you can buy.

Let's get down to a few specifics.

You get extra channels — 36 instead of 24.

Our 70F1 is the only 36 channel, 2-GHz microwave radio to give you a 26.5 dBrnc0 noise performance or better, and our 6.5 dB receiver noise figure is lower than other radios, resulting in superior system gain.



36 channel, hot-standby 70F1 radio assembly

Thus, for the same or better overall performance, we offer you a microwave radio with 36 channels for what you were ready to pay for 24.

We built in the 70F1's baseband so you don't have to engineer or order this equipment separately. One nice, complete, compact package.

And we even have standard assemblies available, like single channel or hot-standby.

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State By State Appropriation of Federal Funds Available for Rail-Highway Projects in Fiscal Year 1974, Ending June 30, 1974

State	Safer Roads Demonstrations (Sec. 230)	Rail-Highway Crossings (Sec. 203)	High Hazard Locations (Sec. 209)
Alabama	$ 889,120	$ 424,961	$ 876,238
Alaska	250,000	697,485	242,500
Arizona	476,040	282,002	469,135
Arkansas	582,591	282,508	574,113
California	4,041,778	1,876,674	3,983,714
Colorado	635,261	343,169	626,028
Connecticut	595,645	279,287	587,098
Delaware	250,000	107,166	242,500
Florida	1,521,091	672,347	1,499,157
Georgia	1,140,167	544,819	1,123,669
Hawaii	250,000	116,134	242,500
Idaho	310,940	188,789	306,379
Illinois	2,384,844	1,102,507	2,350,508
Indiana	1,207,357	553,693	1,189,925
Iowa	873,070	424,522	860,357
Kansas	821,321	388,310	809,313
Kentucky	773,811	372,282	762,625
Louisiana	819,244	393,793	807,429
Maine	250,000	155,120	242,690
Maryland	773,887	366,344	762,782
Massachusetts	1,099,411	490,765	1,083,646
Michigan	1,945,998	892,680	1,917,958
Minnesota	1,076,342	539,693	1,060,706
Mississippi	612,546	305,309	603,654
Missouri	1,206,757	595,595	1,189,273
Montana	348,903	273,432	343,772
Nebraska	565,803	295,544	557,524
Nevada	250,000	183,275	242,500
New Hampshire	250,000	107,357	242,500
New Jersey	1,368,335	612,006	1,348,724
New Mexico	340,020	239,211	335,058
New York	3,567,503	1,661,015	3,516,325
North Carolina	1,182,519	555,065	1,165,444
North Dakota	390,753	205,398	384,989
Ohio	2,239,323	1,021,456	2,207,107
Oklahoma	809,482	380,486	797,688
Oregon	662,599	308,712	652,945
Pennsylvania	2,455,589	1,121,324	2,420,276
Rhode Island	250,000	127,942	242,500
South Carolina	655,413	291,375	645,924
South Dakota	359,035	221,254	353,749
Tennessee	956,411	465,509	942,579
Texas	2,804,479	1,396,632	2,763,885
Utah	335,424	192,837	330,536
Vermont	250,000	86,635	242,500
Virginia	1,022,762	509,746	1,008,023
Washington	854,700	398,241	842,329
West Virginia	421,819	208,008	415,720
Wisconsin	1,123,093	531,125	1,106,828
Wyoming	250,000	174,855	242,500
Dist. of Col.	250,000	62,434	242,500
Puerto Rico	498,814	213,006	491,678
Guam	250,000	—	—
American Samoa	250,000	—	—
Virgin Islands	250,000	—	—
TOTAL	**$50,000,000**	**$24,240,374**	**$48,500,000**

Status Report February 6, 1974

New priority

Grade crossing safety has a new national priority. For the first time in history, Highway Trust Fund money is authorized specifically for rail-highway crossing safety projects. Also for the first time, Federal money is available for crossing projects off the Federal-aid highway systems. Both of these approaches to long-standing goals are included in the Federal Highway Act of 1973. Funds for the new programs are available during the fiscal year ending June 30, 1974, and expanded authorizations are called for during each of the following two years. These funds are in addition to the 10% of its Trust Fund allotment which each state has previously had the option of using for grade crossing projects.

How much money is acually available? What kind of projects can it be used for? Who has charge of planning how it will be spent?

The purpose of this article is to provide answers to these and other questions—as a guide for follow-up action at local and state levels.

If any questions arise concerning the various programs discussed in this article, call or write: Patrick J. McCue, Director Highway-Rail Programs, Association of American Railroads, American Railroads Building, Washington, D.C. 20036—Phone: (202) 293-4206.

Safer Roads Demonstration Program

The Federal-Aid Safer Roads Demonstration Program, created by Section 230 of the Highway Act of 1973, authorizes $250 million in funds for improvements to correct designated safety hazards on public streets or roads not included on any Federal-aid system. Each state's current allotment of these funds is listed in Column 1 of the table accompanying this article.

The authorization covers a three-year period, with $50 million authorized for fiscal 1974 and $100 million for each of the next two fiscal years. This money is intended primarily for use by local authorities on safety projects for which other state or Federal funds are not available.

Eligible for inclusion in the Demonstration Program are projects to:

1. Eliminate hazards at railroad-

for grade crossing safety

highway grade crossings.
2. Correct high-hazard locations.
3. Improve highway marking and signing.
4. Eliminate roadside obstacles.

Local Initiative Necessary

All funds under this program must be applied for by local authorities on a project-by-project basis. In most cases, the local authority is likely to be either the city or county commission or the street or road department of a branch of local government. At the state level, administration of the Safer Roads Demonstration Program is by an agency, or representative, named by the governor of each state. In most states, the governors have assigned the responsibility to the agency that normally handles state road funds. But there are a few exceptions. In these cases, the State Road Department or State Transportation Department, as the case may be, will be able to identify the proper authority.

The law provides that in any case where the state does not have legal authority to construct or maintain a project under this program, the state "shall enter into a formal agreement for such construction or maintenance with the appropriate local officials of the county or municipality in which such project is located."

Federal funds may be used to pay 90% of the total cost of each project, with local or state agencies required to pay the remaining 10% in most instances. Except where crossing eliminations are involved, Federal Highway Administration guidelines do not require or recommend any railroad financial participation. Where crossing eliminations are to be accomplished—from which railroads derive a benefit—the guidelines provide that 90% of the project cost is to be borne by the Federal government. The railroad share is not to exceed 5% of the cost depending on benefits received, and state or local agencies are to contribute the remainder.

Prompt Action Urgent

The law requires that prior to June 30, 1974, the individual states must identify projects to be included in the Safer Roads Demonstration Program, establish priorities for their systematic correction and submit this information to the U.S. Secretary of Transportation. No priority listing is required, however, for projects financed out of the 1974 fiscal year funds.

Projects for the Demonstration Program may be selected from the listing of high-hazard locations developed by the State's Safety Improvement Program; high priority safety improvements identified by areawide Traffic Operational Programs to Increase Capacity and Safety (TOPICS) or TOPICS-type studies; a listing of railroad-highway grade crossings identified from inventories as representing a greater than normal potential hazard; projects identified by a diagnostic team as having a high priority for safety improvement, or projects determined from federally funded accident studies.

The Secretary of Transportation is required to file an interim report with Congress by Jan. 1, 1975, concerning the progress being made under this program and, by Jan. 1, 1976, to file a comprehensive report showing the number of projects undertaken, "their distribution by cost range, road system, means and methods used, and previous and subsequent accident experience at improved locations." This report also must include an analysis and evaluation of the program state by state, with recommendations by the Secretary for further implementation.

With funds now available for some projects and a listing by each state of projects to be included in the continuing program required by June 30, prompt action at the local level is advisable. Otherwise, a community needing assistance may be left out.

Projects on Federal-Aid Systems

Section 203 of the Highway Act of 1973 authorizes the expenditure of $175 million from the Highway Trust Fund specifically for rail-highway crossing projects over a three-year period. The authorization for fiscal 1974 is $25 million, with $75 million authorized for each of the following two years. State allotments are listed in Column 2 of table accompanying this article. This money can be spent only on crossing projects and only on projects located on a Federal-aid system. It also may be used to provide local communities with their share of the required funds if state law calls for joint state-local participation. Since Section 203 money can only be used for crossing projects, any state failing to obligate its share of the available funds for this purpose will forfeit the funds to which it is entitled under this program.

Examples of projects which may be included in this program are:

1. Installation of standard signs and markings at all crossings.
2. Installation of train-activated warning devices.
3. Upgrading of train-activated warning devices, including track circuit improvements and interconnection with highway traffic signals.
4. Crossing illumination.
5. Crossing surface improvements.
6. Separations or closures.

The act requires that at least half of the Section 203 funds be available for the installation of warning devices at rail-highway crossings. It also requires that "at a minimum" each state's program should include providing signs for all rail-highway crossings. The Federal share of the cost is 90%.

This program is administered by state highway or transportation departments.

As in the case of the Safer Roads Demonstration Program, state officials are required to submit annual progress reports to the Secretary of Transportation. The Secretary is required to make a similar report to Congress on the overall program each year, analyze and evaluate the program within each state, identify any state not in compliance with the schedule of improvements required and make recommendations for future implementation. This is a clear indication that the program is intended to be a continuing one. This, plus the fact that authorizations will be tripled for the second and third fiscal years, should encourage local authorities to seek to have all qualifying projects considered whether or not they think they have a chance of getting immediate approval.

Funds provided for rail-highway crossing safety projects under Sections 203 and 230 are in addition to those

otherwise available. That would include the 10% of its total Trust Fund allocation which each state for a number of years has had the option of using, at its discretion, for crossing projects on a Federal-aid system. Projects on streets or roads which are not now a part of any Federal system may qualify for Federal funds in many instances by having the county or municipality petition the State Road Department to designate them as part of one of the Federal-aid systems—particularly the new urban systems.

Other New Programs

The Highway Act of 1973 established and authorized funding for three new programs which, in some instances, may well include grade crossing projects though such projects are not specifically mentioned in these sections. The programs are:

Projects for High-Hazard Locations (Section 209)—This section is designed to reduce hazards on the Federal-aid systems which have high accident experience or potential. Qualifying projects will be identified through a special survey each state is required to make to pinpoint high-hazard locations which constitute a danger to vehicles or pedestrians. The authorization is $50 million for fiscal 1974, with $75 million authorized for each of the following two fiscal years. State allotments are listed in Column 3, of the table accompanying this article.

Priority Primary Routes (Section 126)—These routes are to consist of high-traffic sections on the Federal-aid primary system which connect with the Interstate System. A total of $600 million is authorized for expenditure on improvement of these routes over the next three years—$100 million in fiscal 1974, $200 million in fiscal '75 $300 million in fiscal '76. Selection of the routes is to be made by state highway departments in consultation with local officials, and the initial route selections are to be reported to Congress before July 1, 1974.

Special Urban High-Density Program (Section 125)—This program provides $150 million over a three-year period "for the construction of highways connected to the Interstate System in portions of urbanized areas with high traffic density." Any route included in this program must be on a Federal-aid system and be no more than 10 miles in length. Each state is limited to one route. The authorization is for $50 million a year for the three-year period, fiscal 1974-75-76.

Special Demonstration Projects

A demonstration program of special interest to communities throughout the country, because of its potential in relation to track relocation projects, is provided for by Section 163 of the 1973 Highway Act. This section calls specifically for special demonstration projects in a dozen cities scattered from coast to coast. Projects in Anoka, Minn.; Blue Island and Dolton, Ill.; and Greenville, Tex., involve grade crossing separations. Those in Brownsville, Tex.; East St. Louis, Carbondale and Springfield, Ill.; Elko, Nev.; Lincoln, Neb.; New Albany, Ind.; and Wheeling, W. Va., provide for relocation of railroad tracks from center-city areas, installation of warning devices, or the elimination of grade crossings.

The Secretary of Transportation—in cooperation with state highway departments and local officials—is directed to investigate the feasibility of increasing highway safety by the relocation of rail lines from center-city areas on a nationwide basis and report the result of his study to Congress by July 1, 1975—including an estimate of the cost of such a program.

A total of 90 million in Trust Fund money is authorized for the 12 demonstration projects on a three-year basis, including 15 million in fiscal 1974, $25 million in fiscal '75 and $50 million in fiscal '76.

There are indications that this may well be a continuing program and that funds will be made available for future projects involving rail relocation and the elimination or minimization of grade crossings in downtown areas.

The state highway department is a natural starting point for efforts by local authorities to gain consideration for inclusion of their cities in the study being made by the Secretary of Transportation. But Congressmen from local districts also can be helpful in bringing worthwhile projects to the attention of the Secretary. *(Continued on page 33)*

EDUCATION AND TRAINING

New Signal Training Publications

AAR Signal Training Bulletin reprints are now available. Requests for reprints are coming from railroads all over the country. The AAR has indicated its approval of the quality of reproduction of bulletins. RSC will continue providing this service until the supply of bulletins has been exhausted.

How many bulletins will eventually be available? What are the titles of future bulletins? When will future reprints be available? How much do they cost and how many can be obtained? These are some of the questions being asked by men in the field.

To answer the question about future subject matter, here is a complete list of bulletins scheduled to be published. Some have been completed and others are being worked on.

Series A—Signal Devices and Signal Accessories

A- 1—Bond Wire
A- 2—Insulated Rail Joint
A- 3—Switch Circuit Controller
A- 4—Resistor
A- 5—Lightning Arrester
A- 6—Fuse
A- 7—Derails
A- 8—Spring Switch Mechanism
A- 9—Electric Switch Lock
A-10—Power Switch Machine
A-11—Bells and Annunciators
A-12—Block Indicator
A-13—Retarders
A-14—Instrument housings

Series B—Energy Distribution

B- 1—Primary Battery—Carbon Cell
B- 2—Primary Battery—Copper Oxide Cell
B- 3—Secondary Battery—Lead Acid Storage Type
B- 4—Secondary Battery—Nickel Iron Alkaline Storage Type

B- 5—Secondary Battery—Nickel Cadmium Alkaline Storage Type
B- 6—Transformer
B- 7—Rectifiers
B- 8—Charging Nickel Iron and Nickel Cadmium Storage Battery
B- 9—Charging Lead Acid Storage Battery
B-10—Primary Battery Systems with Rectifiers
B-11—Transmission Lines

Series C—Relays

C- 1—Direct Current Neutral Relay—General
C- 2—Direct Current Neutral Relay—Magnetic Structure
C- 3—Direct Current Neutral Relay—Contacts
C- 4—Direct Current Relay—Operating Characteristics
C- 5—Plug-In Relay—General
C- 6—Thermal Relay
C- 7—Polarized Relay—Neutral
C- 8—Polarized Relay—Retained Neutral
C- 9—Neutral Slow Release Relay
C-10—Biased Relay
C-11—Flasher Relay
C-12—Motor and Electromagnetic Operated—Timer Relay
C-13—Power Transfer Relay
C-14—Magnetic Stick Relay
C-15—Approach Lighting Relay
C-16—Light-out Relay
C-17—Switch Overload Relay
C-18—Code Following Relay
C-19—Code Following VTB Relay
C-20—Code Transmitter Relay
C-21—Alternating Current Relay—General
C-22—Interlocking Relay

Series D—Basic Signal Circuits

D- 1—Direct Current Track Circuit
D- 2—Alternating Current Track Circuit
D- 3—Direct Current Coded Track Circuit
D- 4—Stick Circuit
D- 5—Signal Repeater Circuit
D- 6—Switch Repeater Circuit
D- 7—Loss of Shunt Circuit
D- 8—Typical Lighting Circuit—Highway Crossing Protection
D- 9—Typical Lighting Circuit—Block Signaling
D-10—Alternating Current Coded Track Circuit

Series E—Highway Crossing Protection Systems

E- 1—Highway Crossing Protection—Wig-Wag Type
E- 2—Highway Crossing Protection—Flashing Light Type
E- 3—Highway Crossing Protection—Gate Type
E- 4—Highway Crossing Protection—AFO Track Circuit
E- 5—Highway Crossing Protection—GCP

Series F—Signal Systems

F- 1—Automatic Block Signal System
F- 2—Absolute Permissive Block System
F- 3—Centralized Traffic Control System
F- 4—Classification Yards
F- 5—Cab Signaling and Train Control System

Series G—Measuring Instruments

G- 1—Voltmeter
G- 2—Ammeter
G- 3—Ohmeter
G- 4—Multimeter

Series H—Miscellaneous

H- 1—History of Signaling

Bulletins will first appear in RSC. After appearing there, four to eight bulletins will be grouped together and printed. The first reprints will consist of Bulletins C-1, C-2, C-3 and C-4, which have appeared in March and April RSC.

Price will vary from one group of bulletins to the next since one group of bulletins may contain more material than another. Since the number of copies printed will affect cost, our first price quotation will be based on total orders up to at least 1,000 copies.

Price list for reprints containing Bulletins C-1, C-2, C-3 and C-4

Single reprints (4 bulletins, 8 pages) 50¢ per reprint
5 to 24 reprints .....35¢ per reprint
25 to 49 reprints .....32¢ per reprint
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Reprints will be printed on heavy stock paper, same as RSC cover stock, and will have holes to fit standard three-ring binder.

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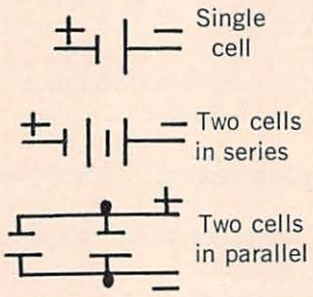
1. Title: PRIMARY BATTERY CARBON CELL

2. Definition:

(a) Primary Battery: A device for the direct transformation of chemical energy into electrical energy.

(b) Electrolyte: The fluid surrounding the elements of the battery.

3. Symbol:



4. Description:

The carbon cell consists of one carbon electrode and two zinc plates in a solution of caustic potash (potassium hydroxide). There are two basic types of carbon cells, renewable and non-renewable. The non-renewable carbon battery consists of one or more cells sealed in a molded case and is activated by the addition of the prescribed amount of water. See Fig. 1.

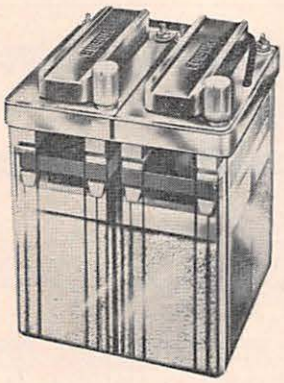


Fig. 1

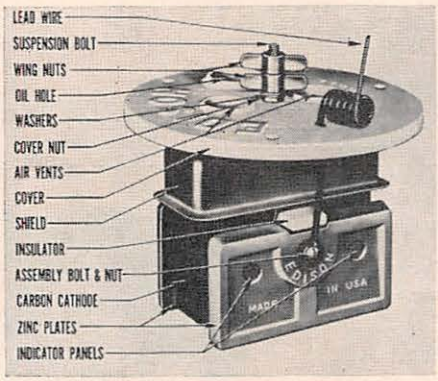


Fig. 2(a)

Fig. 2(b)

The renewable carbon cell consists of an element of two zinc plates and one carbon block, glass container, electrolyte and porcelain cover with air vents. See Figs. 2(a) and 2(b).

Note: The last U.S. manufacturer of the renewable carbon cell battery will discontinue production of this battery as of August 1, 1974. Although this line of batteries will be discontinued, some railroads will continue to put renewable carbon cell batteries in service until existing stocks are exhausted.

5. Purpose and Application:

A primary battery is used as a power source to supply direct current for railway signal system circuits and appliances.

It can be used as a source of energy for track circuits, signals and highway crossing protection, particularly at remote locations where an ac charging source of power is not available.

6. General Information:

(a) The carbon cell gives best results where plenty of fresh air is available. When battery housings are provided, a slight amount of ventilation is necessary to permit air circulation and to dissipate dampness. It is important that carbon elements be kept dry.

(b) Primary batteries cannot be recharged. When carbon cells are used with a rectifier, adjustment of the rectifier output should always be made so that the battery does not receive a charge.

(c) It is not recommended that carbon cells be used in any installation where the battery service life is expected to exceed two years.

(d) The nominal voltage of a carbon cell is 1.2 to 1.6 volts depending upon temperature, discharge current rate and state of exhaustion. Battery capacities range from 500 to 3000 ampere-hours.

7. Detailed Operation:

In operation, carbon cells are depolarized by oxygen extracted from the air which reaches the depolarization area through a porous carbon electrode. The carbon (positive) electrode takes oxygen from the air. The zinc (negative) plates gain oxygen to form zinc-oxide, which is immediately dissolved in the electrolyte.

When a non-renewable carbon battery is exhausted, it is discarded and replaced with a new battery. If indicator panels are not provided, battery life can be calculated on a calendar basis, or by use of a shunt meter in accordance with manufacturer's instructions.

When a renewable carbon cell is exhausted, it can be renewed by replacing the element and the solution. A maintainer can determine if the battery is ready for renewal by making a visual check of the amount of zinc remaining in the battery. Indicator panels are molded into the outside surface of the zinc plates. The panels gradually perforate as the capacity of the cell is consumed. When they are completely eroded the cell is ready for renewal.

1. Title: PRIMARY BATTERY COPPER-OXIDE CELL

2. Definition:

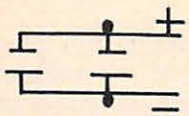
(a) Primary Battery: A device for the direct transformation of chemical energy into electrical energy.

(b) Electrolyte: The fluid surrounding elements of the battery.

3. Symbol:

Single cell

Two cells in series



Two cells in parallel

4. Description:

The copper-oxide primary cell consists of at least one copper-oxide plate (positive) and two or more zinc plates (negative), in a solution of caustic soda (sodium hydroxide).

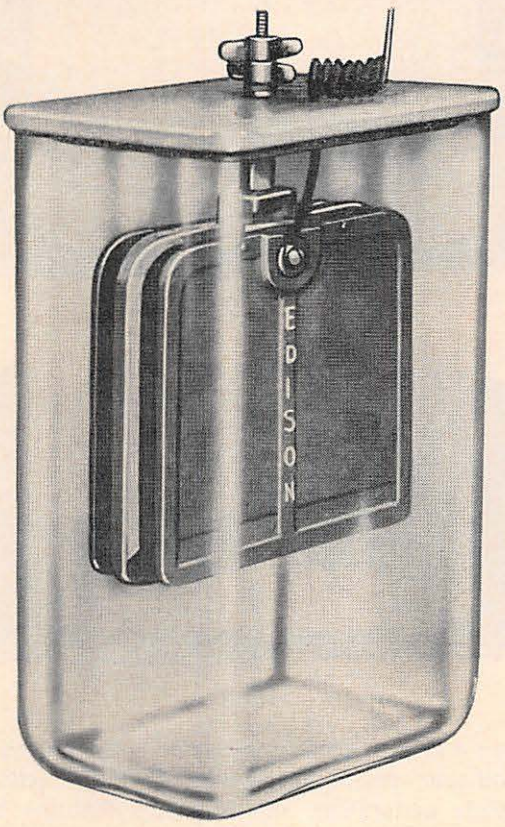


Fig. 1

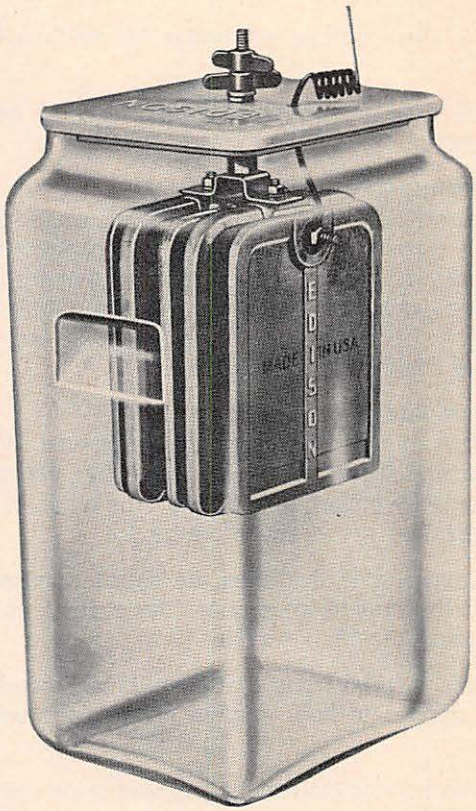


Fig. 2

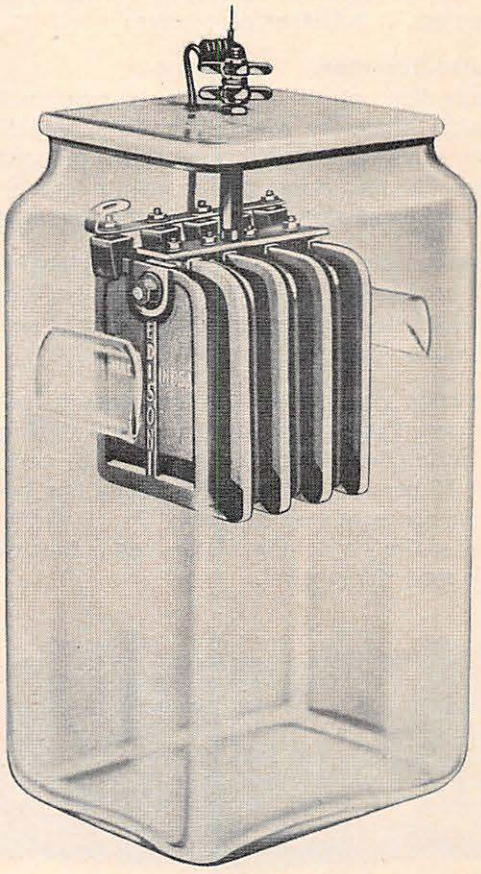


Fig. 3

There are three general types of copper-oxide cells:

Fig. 1—One positive electrode, for light duty service.

Fig. 2—Two positive electrodes for medium duty service.

Fig. 3—Four or more positive electrodes for heavy duty service.

5. Purpose and Application:

A primary battery is used as a power source to supply direct current for railway signal system circuits and appliances. It can be used as a source of energy for track circuits, signals and highway crossing protection, particularly at remote locations where an ac charging source of power is not available.

6. General Information:

(a) Primary batteries cannot be recharged. When copper-oxide cells are used with a rectifier, adjustment of the rectifier output should always be made so that the battery does not receive a charge.

(b) Copper-oxide batteries in signal service require very little maintenance once they are set up and circuits are properly adjusted.

(c) It is very important that all cells be properly set up. This applies to both original installations and renewals.

(d) The nominal voltage of a copper-oxide cell is 0.5 to 1.0 volts depending upon temperature, discharge current rate and state of exhaustion. Battery capacities range from 75 to 1000 ampere-hours.

7. Detailed Operation:

In operation, electrical energy is produced by the chemical processes of oxidation and reduction. The copper oxide plate loses oxygen and is reduced to pure copper. The zinc plates gain oxygen to form zinc oxide which is immediately dissolved in the electrolyte.

The gradual disappearance of the zinc plate is the only result of chemical action that can be seen. Visual indications of approaching exhaustion can be seen in the outside zinc indicator panels.

Some cells are provided with two-panel indicators with each panel being the same size and thickness. The first perforations (Fig. 4) occur in both panels when about 85 percent of the cell capacity has been used. The erosion continues gradually (Fig. 5) until the panels are entirely open (Fig. 6). The cell is then exhausted and is ready for renewal.

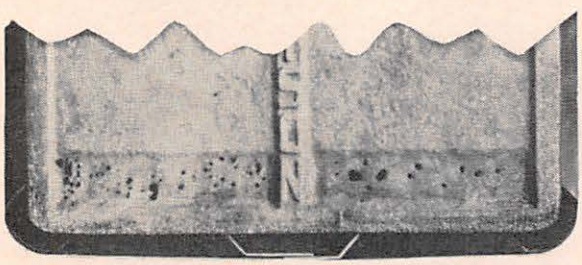


Fig. 4

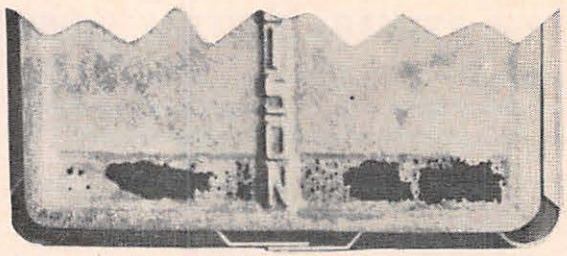


Fig. 5

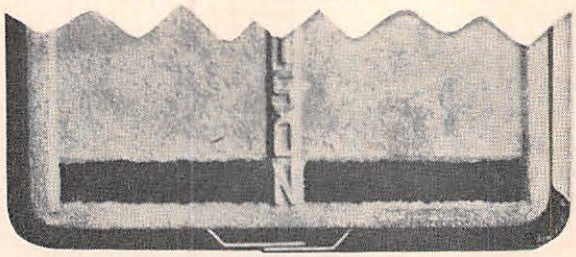


Fig. 6

Some cells are provided with two-panel indicators with each panel being of the same size but of different thickness in order to provide a progressive indication of exhaustion. Perforation starts in the left hand panel. And when this panel is completely eroded (Fig. 7) the cell has delivered 75 percent of its rated capacity. The right hand panel then begins to perforate, and the entire perforation of both panels (Fig. 8) indicates complete exhaustion.

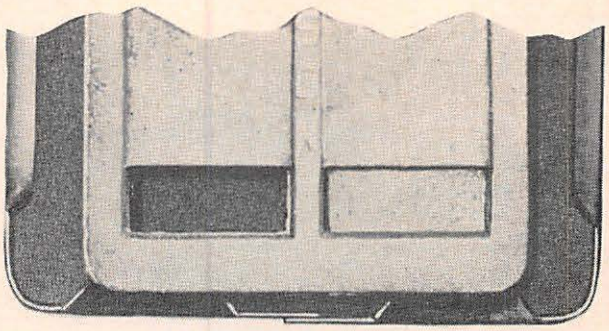


Fig. 7

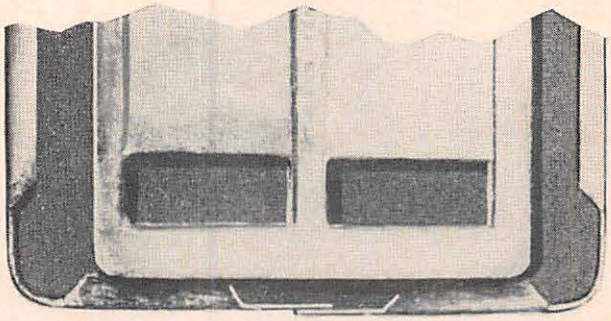


Fig. 8

A good rule to follow is to renew an entire battery when all indicator panels in the majority of the cells show complete perforation. This indicates that the battery is exhausted.

1. Title: SECONDARY BATTERY LEAD-ACID STORAGE TYPE

2. Definition:

(a) Secondary Battery: A combination of two metals or metalloids immersed in an electrolyte which in itself will not produce electrical energy without first having the metallic portion of the element decomposed by the passage of electric current.

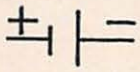
(b) Storage Cell: A secondary cell for storing electrical energy at one time for use at another time.

(c) Charging: The process of putting energy into a battery.

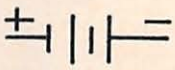
(d) Discharging: The process of taking energy out of a battery.

(e) Electrolyte: The fluid surrounding the elements of the battery.

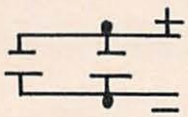
3. Symbol:



Single cell



Two cells in series



Two cells in parallel

4. Description:

The basic parts which make up one complete cell of lead-acid storage battery are positive and negative plates, separators, containers, cover and electrolyte.

In the lead-acid battery, fully charged, the positive

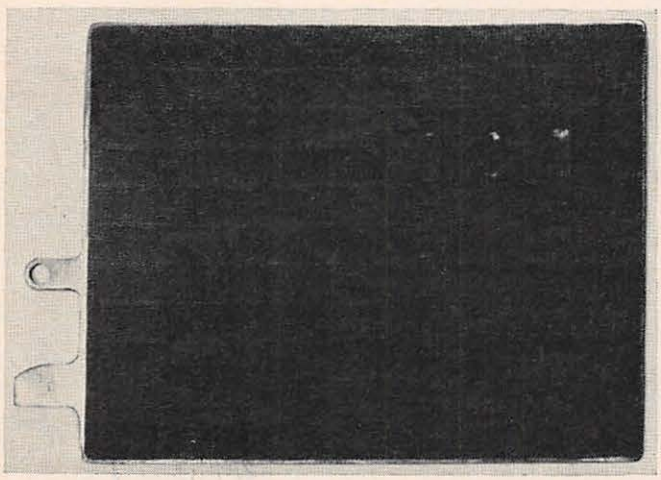


Fig. 1
Lattice

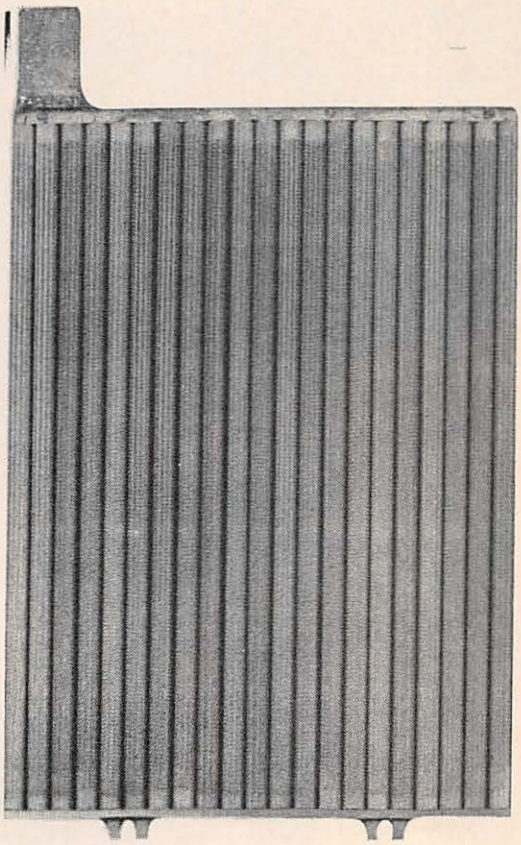


Fig. 2
Tubular

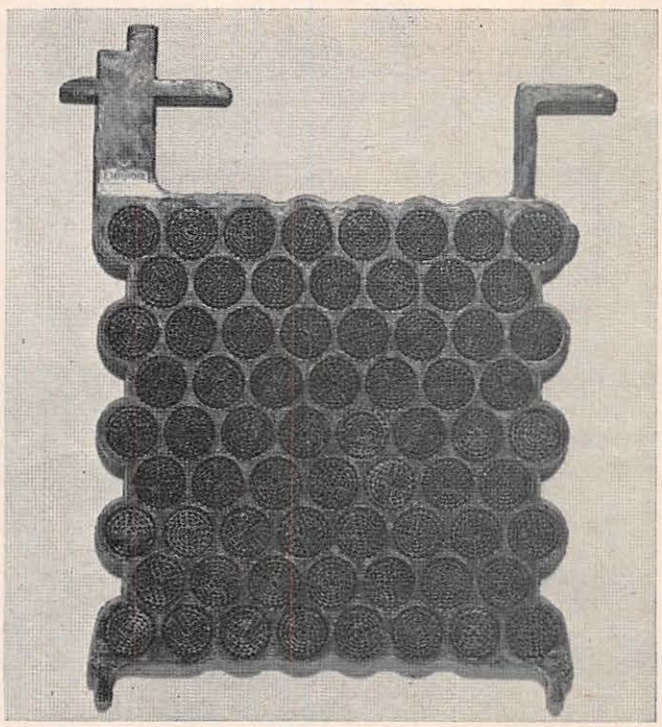


Fig. 3
Spiral Button

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plate is lead peroxide, the negative plate is sponge lead (Pb). Fig. 1, 2, and 3 illustrate three different types of plates. The electrolyte is dilute sulphuric acid, with a specific gravity of 1.21 to 1.22, or about four parts water to one part acid by volume. The state of charge of the battery can be determined by measuring the specific gravity.

5. Purpose and Application:

The lead-acid storage battery is used as a dc power source at locations where an ac charging source is available. It can be used for track circuits, signals, highway crossing protection or for any railway signal appliance or circuit that requires direct current.

6. General Information:

Some factors affecting the amount of energy that may be obtained from a lead-acid battery are temperature, specific gravity and final voltage. A battery's capacity is highest at higher temperatures. The standard reference temperature is 25C (77F). The higher the specific gravity, the greater the battery capacity. High specific gravity, however, tends to increase standing loss and shorten battery life.

The nominal voltage of a lead-acid cell is 1.75 to 2.00 volts depending upon temperature, discharge current rate and state of exhaustion.

Some general rules for storage battery installation and maintenance:

(a) Check polarity and connection when installing.

(b) Maintain proper charge.

(c) Maintain proper electrolyte level by adding water but do not overfill.

(d) Keep battery dry and clean.

(e) Avoid flames or sparks around battery since discharged gases might explode.

(f) Keep vent plugs in place and tight.

(g) Check terminal nuts at regular intervals and tighten if necessary.

(h) Keep terminals coated with grease as specified by railroad maintenance instructions.

(i) Never add acid to a cell to bring the electrolyte to the proper level.

(j) Battery should not be left in a discharged state.

(k) The electrolyte is acid and is injurious to skin and clothing. If spilled, it can be neutralized with the application of a solution of baking soda followed by rinsing with water.

7. Detailed Operation:

See Fig. 4: As the cell is discharged, the electrolyte divides into hydrogen and sulphate. The hydrogen combines with oxygen, formed at the positive plate, to produce water, and the sulphate combines with the lead of both plates to form lead sulphate. The more the battery discharges, the more dilute the electrolyte becomes and the greater the amount of lead sulphate formed on the plates.

When the battery is put on charge, this entire procedure reverses and when fully charged, additional charging will not raise the specific gravity any higher. As the cells approach full charge, all the energy of the charging current cannot be absorbed and this current separates the hydrogen and oxygen components of the water which leave the cells as gases.

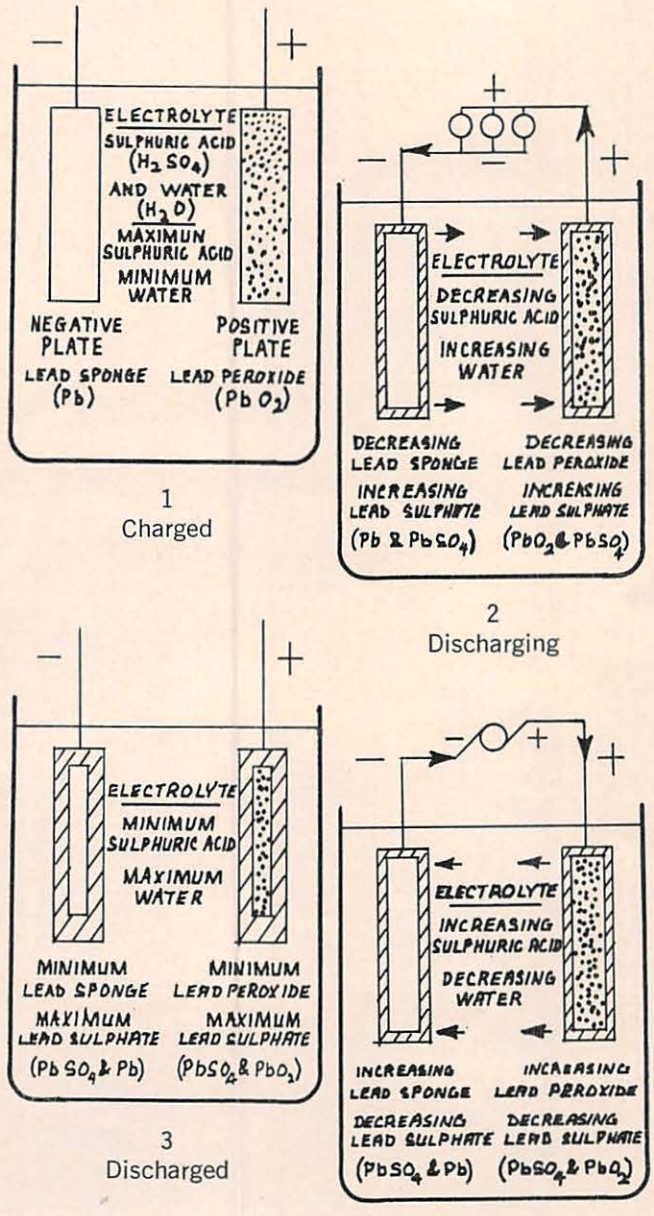
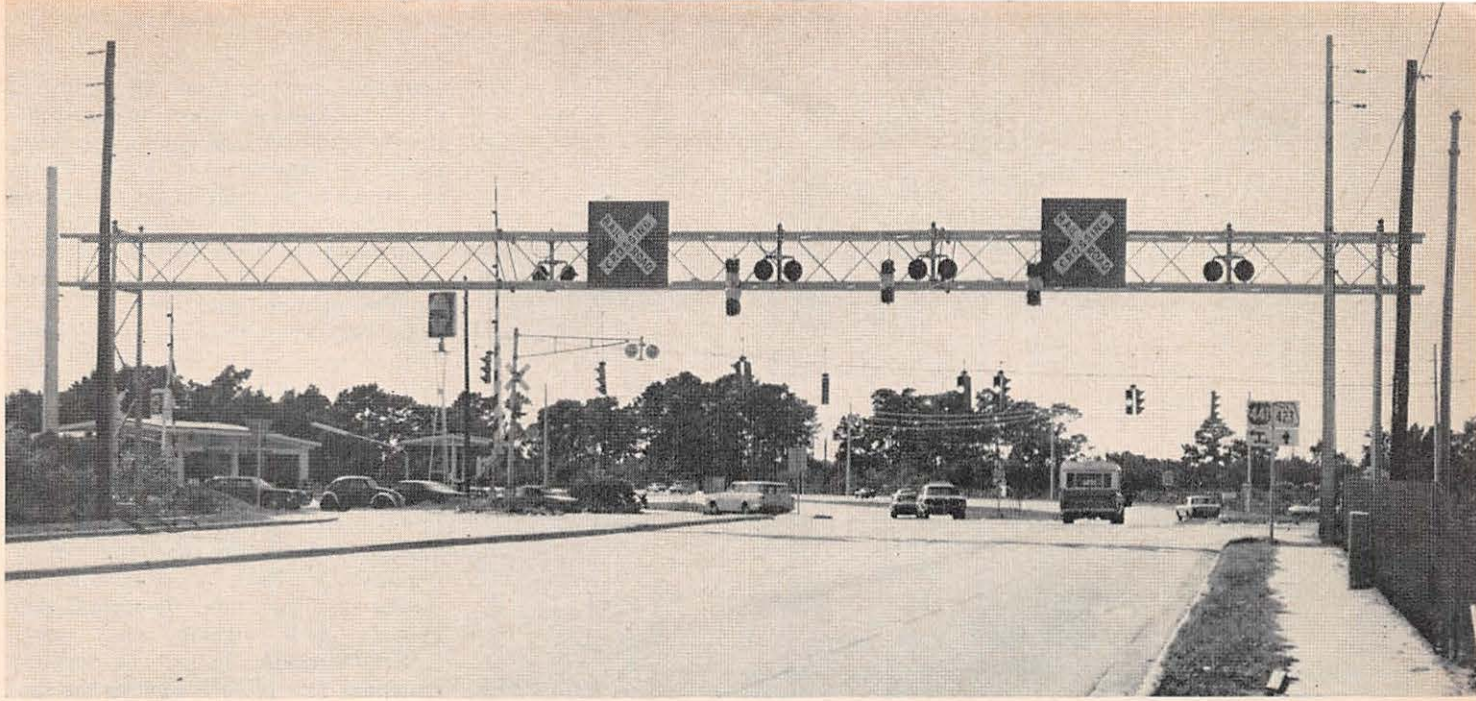
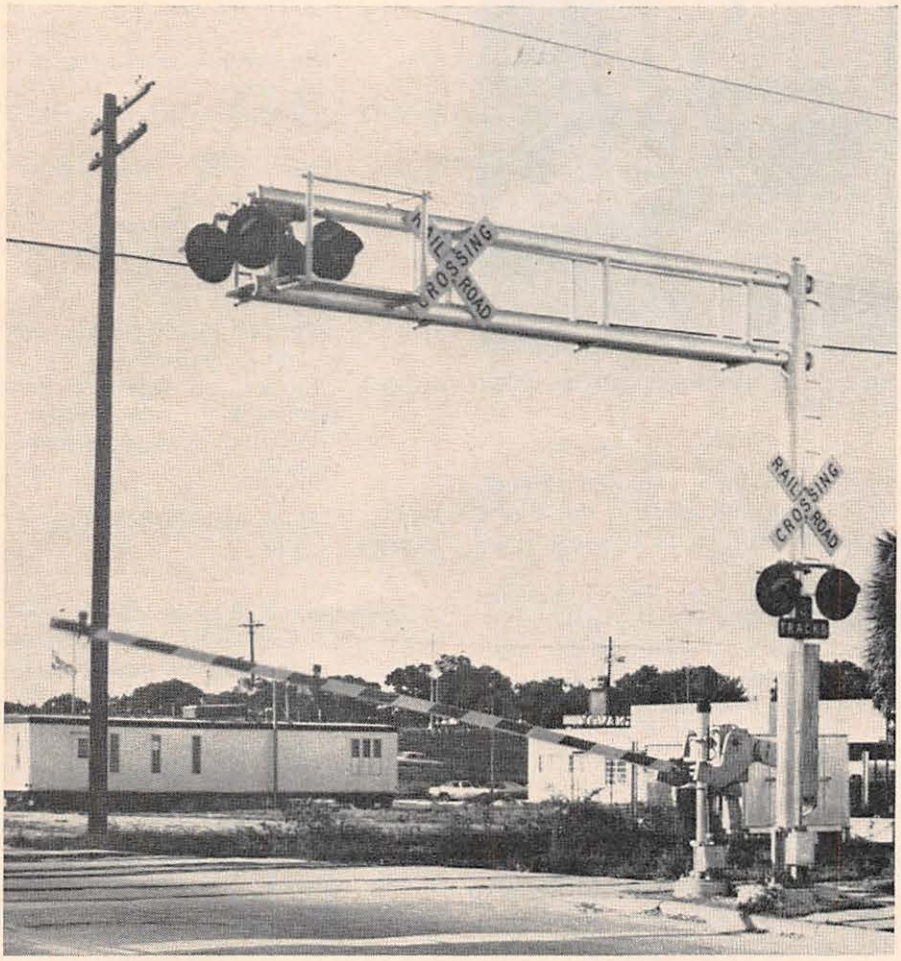


Fig. 4



Wider roads and safety legislation brought about the use of the first highway grade crossing signal bridge in 1970.

The case for the walkout cantilever



As a result of mounting pressure from the industry Western-Cullen designed, built and delivered their first aluminum walkout cantilever in 1971.

Cantilevers have received increasing emphasis over the last few years for several reasons. Street and roadways have become wider and safety legislation has required signaling devices to be set back further from the roadway. Unlike the traditional flashing light signal, cantilevers put the signal over the traffic lanes, providing greater safety for both highway and rail traffic. And they can be set further back from the roadway.

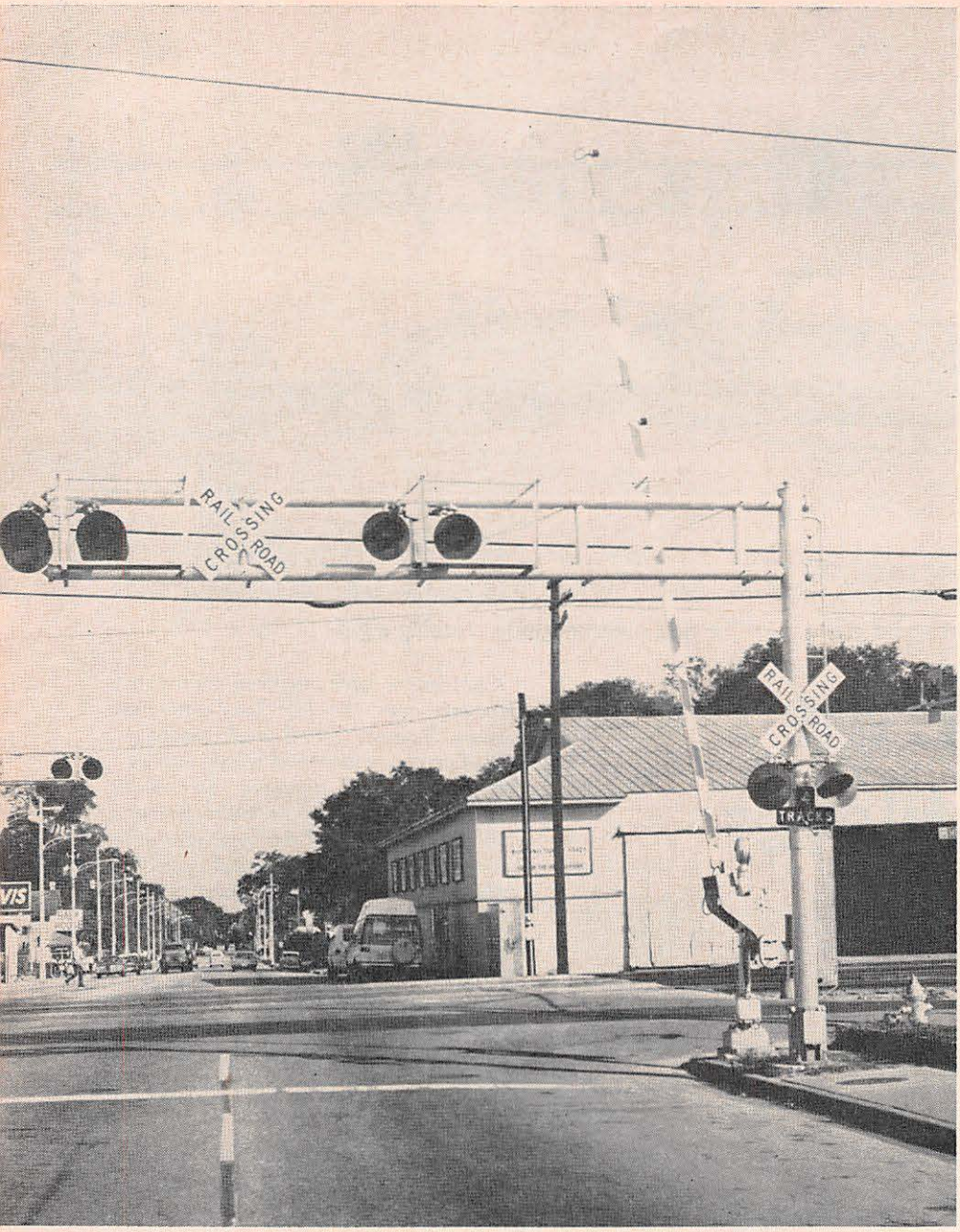
With the passage of the Federal Highway Aid Act of 1973, the present rate of protecting crossings may more than double by 1975. Aluminum walkout cantilevers will likely be used for many of these crossings.

Robert T. Sewell, product manager for signal and communications equipment at Western-Cullen, addressed a meeting of the Western Signal Engineers in Chicago concerning recent developments in the use of cantilevers for railroad crossing protection. Sewell's presentation began with a question asked by many persons in the railroad signal fraternity.

"Why should the management or the states be willing to pay for walkout cantilevers?" The answer is a multipoint statement of facts which are:

1. Safety for maintenance personnel servicing the flashing light units.
2. Safety for the trains and their crews by providing better warning to motorists.
3. Increased street widths that are beyond the reach of the rotatable cantilever to position the lights over the traffic lanes.
4. Increased set-back requirements from the curb edge add to the street widths requirement of point 3.

The history of the walkout cantilever at Western-Cullen began immediately



The extendible tip of this widely used single plane cantilever can be either bolted or welded in place at the user's descretion.

in the years following World War II. Around 1946-47 the walkout cantilever was a very heavy steel structure that is still pictured in the AAR Signal Manual. This was a product that not only Western-Cullen provided but was also provided by the other major signal equipment suppliers. Many of these structures are still in service today.

Due to the cost of erecting and maintaining the steel structure, the railroads demanded something better. The response was the rotatable cantilever which was lightweight, aluminum (no painting required), and could be swung out of the roadway to permit bulb replacement and roundel cleaning of the flashing light units on the arm. In response to the demand, delivery of such units started in 1964. Design and construction has been improved through the years and this model is still a very popular product for the U.S. and Canadian roads.

During the late 1960s' Western-Cullen built a few mono-pole cantilevers, that is, a non-rotatable non-walkout design. Though attractive in appearance and built of aluminum, they had the disadvantage of putting the maintainer in the middle of traffic while trying to service lights on the arm.

Western-Cullen delivered their first highway grade crossing signal bridge in 1970. This three-piece 105-ft. span permitted easy access to the flashing light units because the maintainer could walk out on the bridge and be clear of motor traffic.

Shortly thereafter, as a result of mounting pressure from the industry, Western-Cullen designed, built and delivered their first aluminum walkout cantilever structures in 1971. These structures form a design point of view conformed with the limited criteria as set forth by the AAR, the design recommendations by the customer, and our engineering judgment.

In 1973 Western-Cullen and Planet Corp. teamed up to manufacture and deliver walkout cantilevers at a greater pace than Western-Cullen was able to provide through its own facilities. Planet is a highly experienced firm in highway structure design and fabrication and consequently met the needs of Western-Cullen. The resulting design criteria as set forth by the coordinated design of Planet and Western-Cullen exceeds AAR criteria and meets AASHO* criteria. In fact, all walkout structures now offered, such as the single plane walkout cantilever, the box truss cantilever, and the box truss signal bridge, meet criteria such as these:

Source	Requirement
AAR	Wind load—100 mph
AASHO	Wind load—100 mph plus 30% gust factor
AAR	250 lb live load
AASHO	500 lb live load
AAR	No welder certification requirement
AASHO	Certified welders required
AAR	No specific material alloy requirements
AASHO	Specific recommendations for all structural shapes, alloys
AAR	Vertical tip deflection of eight in. maximum
AASHO	Vertical tip deflection not below 17 ft. with all loads, live, ice, dead weight applied
AAR & AASHO	Horizontal tip deflection of 24 in.

These criteria led to the widely used single plane cantilever design that is available in essentially six sizes ranging from an eight ft. to 40 ft. arm length. The extendible tip can be bolted or welded in place at the user's discretion. It should be noted that the single mast design is carried to 31 ft. arm length; above that to 40 ft. arm length, double masts are required. Bevond 40 ft., the use of a box truss design is recommended.

*American Association of State Highway Officials

Signaling and communication projects continuing in '74

ATCHISON, TOPEKA & SANTA FE:
Santa Fe completed installation of traffic control signaling, from Temple, Tex., dispatcher's office, Rosenberg Junction to Alvin, Tex., adding 36 miles to complete the project. Additional hot box detector sites were activated at six stations on the system. Santa Fe has completed installation of VHF radio equipment on 67 locomotives, 26 autos, 20 roadway machines, and a base station at the rail welding plant at Amarillo. Two high speed printers were installed in the Chicago relay office, one teleprinter at the rail welding plant and one for the Agent's training class at Amarillo.

BESSEMER & LAKE ERIE:
The railroad has installed hot box and dragging equipment detectors at McBride, Pa.

BURLINGTON NORTHERN:
BN is completing installation of: 48.1 miles of CTC between Red Oak and Creston; 5.2 miles of ABS between St. Anthony Park Jct. and Northtown; 45.0 miles of CTC between Galesburg and Savanna; 4.5 miles of CTC between Forsyth and Nichols. BN is completing installation of 13 hot box detectors on four regions of the railroad. Additions to communications include completing installation of a microwave system between Chicago and Spokane and installation of UHF and VHF equipment to permit Locotrol operations through the Cascade Tunnel.

CHESSIE SYSTEM:
The Chessie has completed installation of a communication control center for ACS-HCS data communications network in Baltimore, Md. at a cost of $147,250.

CHICAGO & NORTH WESTERN:
Crossing protection has been installed at two new locations, and improved existing crossing protection has been completed at one other location. A total of 123 radios have been provided for base stations, mobiles, engines, portables and marine installations.

CHICAGO, MILWAUKEE, ST. PAUL & PACIFIC:
A high-speed communication link has been established over a dedicated telephone circuit between the central computer at Chicago and the System 3 yard computer located at Milwaukee, Wis.

CHICAGO, ROCK ISLAND & PACIFIC:
The Rock Island has improved crossing protection on two locations on the property at a cost of $4,000.

COLORADO & SOUTHERN:
A total of five new grade crossings were installed in various parts of Colorado and Wyoming. Dispatcher controlled base radio stations were installed at six locations beginning at Walsenburg, Colo., and ending at Clayton, N.M., a distance of 166 miles.

ELGIN, JOLIET & EASTERN:
An uninterruptible power supply has been authorized to serve data terminals at Joliet, feeding the computerized Car Control System. Automatic flashing light signal protection was installed at Five Corners Road, Plainfield, Ill., Authorization has been secured to fill in voids in the block signal system be-

Their new signal system really conserves energy!

S & C projects continuing in '74

tween Joliet, Ill. and Hartsdale, Ind. Installation should start shortly, with completion anticipated by late '74. Installations are scheduled for 26 automatic grade crossings to be completed by the end of the year. Block signals are being investigated for installation between Stockton and Marks on the Lake Front Line and to fill in voids between Normantown and Eola. A dispatcher-controlled radio system is being planned to supplement and complement the existing Mainline End-to-End Radio System.

GREEN BAY & WESTERN:
A radio communication system is being installed over the entire system.

ILLINOIS CENTRAL GULF:
ICG has upgraded the signal system between Baton Rouge and Harahan, La., to eliminate outside interference for increased signal reliability. ICG has installed a spring switch and controlled signaling at the junction of Sparta and Cairo Districts, Cairo, Ill., to improve train operation.

KANSAS CITY SOUTHERN:
The KCS is continuing conversion of ABS to CTC from Sandra, La., to Blanchard, La., a distance of 30.3 miles. Four automatic grade crossings were placed in service at various locations throughout the system. The installation of loose-wheel-broken flange detector on north main track at Kansas City, Mo., yard, has been completed.

LOUISVILLE & NASHVILLE:
L&N has installed two flashing light projects for protecting highway crossings in Kentucky and Tennessee. Two new hot box detectors have been installed and four others have been relocated to give L&N a total of 62 hot box detectors. Various radio and telephone equipment has been added to the communications department.

MISSOURI-KANSAS-TEXAS:
MKT proposes to modify part of its signaling system and upgrade several crossing locations.

MISSOURI PACIFIC:
The conversion of 87 miles of automatic block signaling to centralized traffic signaling between Bald Knob and Briark, Ark., has recently been completed at a cost of approximately one-half million dollars. Automatic crossing protection was installed at 20 public crossings at various locations on the system during the first part of '74. Installation of hot box detectors and dragging equipment detectors at Olden, Chub, and Wickett, Tex., were recently completed at a total cost of about $90,000. Mini-computers with related accessories to implement yard and terminal sub-system have been installed at four locations on the system at a cost of over $400,000.

NORFOLK & WESTERN:
The N&W is continuing to install and modify various traffic control systems on portions of the system. The road's communications system is undergoing modernization by using microwave.

ST. LOUIS-SAN FRANCISCO:
A total of nineteen rail-highway grade crossings will be completed by the end of the year. Various signaling projects are under way on a number of sidings and tracks. Four hot box and dragging equipment detectors have just recently been installed on the railroad. A total of 59 radio installations are being completed for various applications on the railroad.

SEABOARD COAST LINE:
New highway grade crossing signals have been installed at 22 locations and 11 others have been modified and upgraded. Four defect detectors have been installed on the property at a cost of $164,000. A total of 74 radios have been installed or upgraded on a number of areas of the SCL. Rehabilitation of 114 miles of communication pole line has been recently completed.

SOO LINE:
Soo Line has completed installation of five crossing signals for a total cost of $64,000. Work has started on five additional crossing signals. One data circuit for ACI was installed at a cost of $3,700.

SOUTHERN:
Southern has installed 20 new automatic highway crossing protection systems and upgraded 35 existing systems.

SOUTHERN PACIFIC:
Improvements were made at nine locations by installation of bidirectional hot box detectors and derailment detectors.

UNION PACIFIC:
Hot box detectors have been installed at three locations in Wyoming and Idaho.

WESTERN PACIFIC:
A new TCS machine has been installed for dispatchers at Sacramento which controls all TCS systems on the railroad. A hot box detector has been placed in service at Deeth, Nev.

Why for a

Servo is the world's leading producer of electronic hot box detector systems.

We're not experts in every phase of railroad safety — but as the industry's pioneer designer and producer of electronic hot box detection systems, we can claim a high level of successful experience in working on the problems of bearing failures, axle burn-offs and derailments associated with undetected hot boxes.

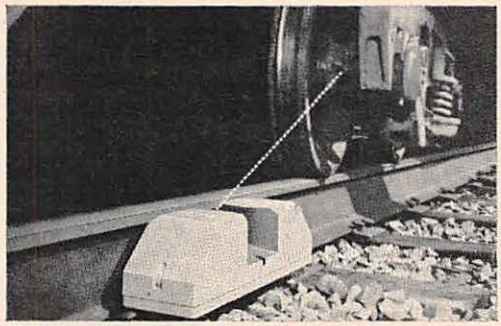
Since 1957, more than 1,800 SERVOSAFE Hot Box Detective Systems have been put into service, and have compiled an unequaled record of safety improvement, more efficient preventive maintenance procedures and cost reduction.

Hot box detectors available from Servo offer the widest flexibility in choice of system configuration, features and functional options, including: rail-mounted or ballast-mounted scanner; a complete selection of ancillary and test equipment; solid-state electronic signal processing. Several modes of data read-out are also available — automatic digital read-out at trackside or remote location; pen-paper recorder chart for visual interpretation; FM carrier data transmission over unlimited distances.

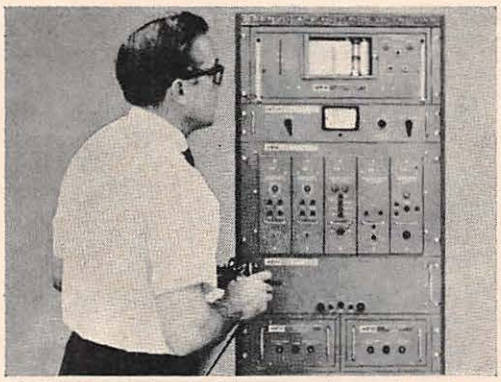
With our broad range of products and world-traveling network of field engineers, we can readily "customize" the design, manufacture, installation and operation of a SERVOSAFE System to best meet the particular requirements of your railroad.

You are invited to contact us for complete descriptive literature, or to arrange a field engineering site survey and application review — without obligation, of course.

spend the capital SERVOSAFE® system?

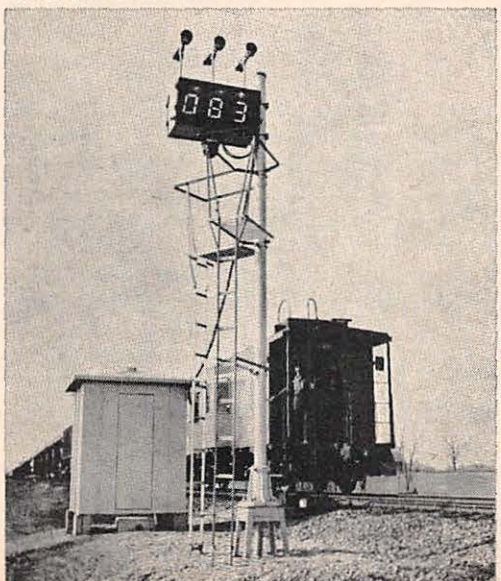


Rail-mounted scanner "looks" at and measures the heat radiated by passing journal boxes.



Solid state electronic data processing equipment, with permanent record chart recorder.

Trackside display board gives digital read-out of hot box location.



BECAUSE SERVOSAFE CAN REDUCE MAINTENANCE COSTS. Journal box and wheel set maintenance represent substantial costs each year. Part of these costs is due to normal bearing wear as cars age. Much higher costs, however, are involved when equipment is needlessly damaged by continued operation after lubrication has failed—causing major salvage jobs or replacement of wheel sets.

Where SERVOSAFE Systems are used for early detection, experience has shown that only 1 out of 10 hot boxes required a wheel set replacement. With other methods, as many as 9 out of 10 that came in for repair required new wheel sets.

BECAUSE SERVOSAFE CAN REDUCE LABOR COSTS. With SERVOSAFE providing an automatic and more precise method of inspecting journal boxes, railroads have been able to significantly reduce the number of personnel formerly required for manual and visual inspection of wheel journal boxes.

BECAUSE SERVOSAFE CAN MORE THAN PAY FOR ITSELF. Obviously, the single most important reason to make a capital investment in SERVOSAFE is to decrease the fearsome prospect of one of the greatest capital losses a railroad faces: a derailment caused by a bearing failure. The total cost of a derailment cannot be determined in advance, but it is not unrealistic to estimate that one serious derailment could cost a railroad more than 20 times the investment in a SERVOSAFE System. That's why most railroads agree that SERVOSAFE protection isn't costly—*lack of it is!*

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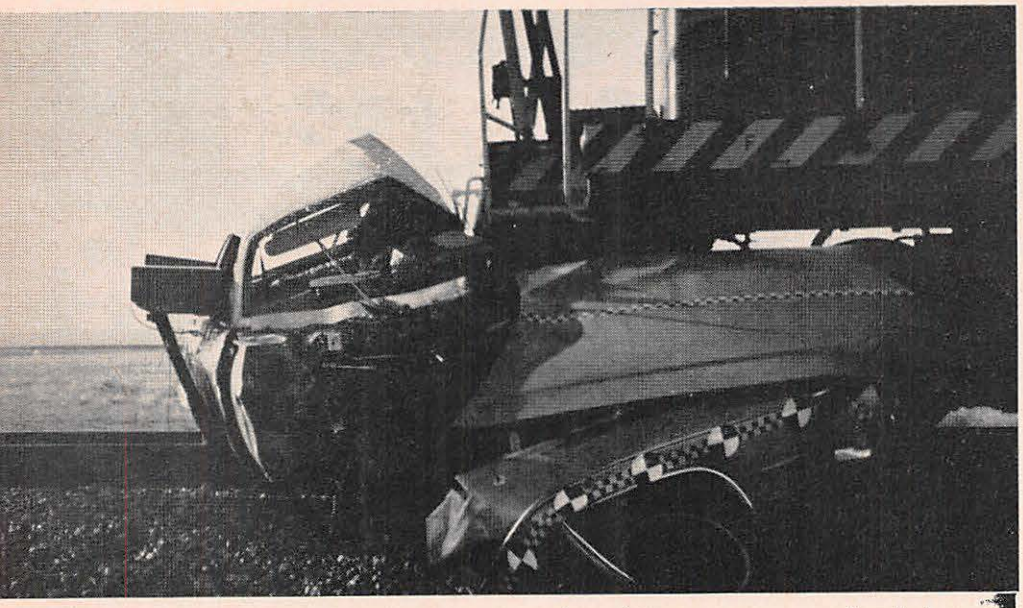


During crash testing, high speed motion picture cameras are located on the locomotive, the ground, and on the automobile to record visual parameters of the test during and after impact.

Impact tests make way for better crossing safety

There are over a half-million public, private and pedestrian railroad grade crossings in the U.S. where an average 1,500 people have died and 7,000 others have been injured annually over the past ten years. Over 40% of the accidents take place at crossings which have some form of active protection!

The Federal Railroad Administration believes that technological solutions are only part of the answer, a view held by many others. One solution, universal grade separation, would cost an estimated $100 billion—or about twice the combined net worth of all the railroads. Another solution would be universal application of warning devices which are in common use on protected crossings. The cost of active grade crossing protective systems is largely hidden, in both a figurative and literal sense. Signal hardware is typically only 5% to 10% of the total installation expense. Control circuits and components at the crossing are another important part, as is the equipment at trackside necessary for detecting the presence of a train and imparting that information to the control apparatus. Installation labor, of course, represents another major expense. A study written by The Department of Transportation's Transportation Systems Center at Cambridge, Mass., for the FRA indicates that, in the area of warning systems, an important goal is development of a sensing and communication system which not only reduces equipment cost, but also installation, maintenance, and design costs.

Another aspect of the grade crossing problem is the number of people and organizations involved: the railroads, the highway interests, various state and local bodies, and the millions of drivers —all independent of one another. Among the public agencies involved, there are varying degrees of authority and responsibility. Many crossings are used very infrequently and very few such sites have sufficient accident potential to economically justify the cost of train-activated crossing protection.

The Federal Government first became involved with the grade crossing problem in the 1930's. Programs were initiated to improve safety and there was an immediate and significant reduction in the accident rate.

When the Department of Transportation was created in 1967, an effort was begun to undertake basic research programs to gain an understanding of the problem. The current problem may be measured in terms of railroad mileage, highway mileage, amount of train travel, amount of motor vehicle travel, number of grade crossings, and number of accidents occuring at those grade crossings. Studies have been undertaken to determine the factors influencing safety at highway-rail grade crossings. Other studies have been made concerning technological innovations and various factors involved with improving the effectiveness of warning systems.

The Department of Transportation has taken a new approach to the deaths and injuries caused by locomotive auto crashes. As our cover illustrates, DOT is exploring the problem at the point where either the grade crossing signals did not stop the driver or when no signals were used to warn of the presence of a train and the driver failed to "stop-look-and-listen."

For the research program, according to John W. Ingram, FRA administrator, "One of the locomotives credited with saving Soviet Russia as a fighting ally in World War II is now being used to save lives at the grade crossings of America." The locomotive-auto crash tests are being carried out at the DOT High Speed Ground Test Center located in Pueblo, Colo. The locomotive being used for the impact tests was once part of a fleet of road-switcher diesels operated in Iran in the 1940's by the U.S. Army.

Ingram said the series of impact tests will provide baseline data for reference in evaluating possible changes in the design of rail equipment and highway vehicles, to improve crashworthiness. The tests are part of a continuing DOT program to reduce injuries and deaths from collisions at rail-highway grade crossings.

The crash testing activity is being directed for FRA by the Transportation Systems Center. Actual testing is being performed by Dynamic Science Division of Ultrasystems, Inc., of Phoenix, Ariz. A special "impact tract" branching off of the FRA's 5.5-mile Train Dynamics Track at the Pueblo center is utilized for the collisions. The locomotive is fitted with an automatic control system and approaches speeds of 50 mph immediately prior to impact. High speed motion picture cameras are located on the locomotive, the ground, and on the automobile to record visual parameters of the test during and after the impact.

Initial crash tests established the operational viability and safety of the procedure. Fully instrumented tests are being conducted with extensive instrumentation of both the locomotive and the automobile. An instrumented anthropomorphic dummy is within the vehicle to allow for evaluation of forces and trajectories that would be applied to a human operator in such a crash.

"We all know the locomotive wins the bout," Ingram stated, "but the purpose of these tests is to acquire data that might suggest design changes which might lessen the impact and severity of grade crossing accidents."

Problems / Solutions

Although it has been quite some time since anyone has submitted any problems or solutions to RSC, the Problems and Solutions Department is still open. RSC will pay $5 for a good problem and $10 for solutions approved for publication.

A recent conversation with Ed Joscelyn, Senior Systems Analyst for Penn Central's Communications and Signals Department, brought up an interesting problem which must confront many engineers when installing Audio Frequency Overlay Equipment. Are there any takers for a good solution?

Problem:

When installing a new AFO track circuit for grade crossing protection, what steps must be taken to prevent interference with other grade crossing circuits within the same block? In many cases one can find two or more grade crossings within the same block. Of course not all of these grade crossings require automatic protection, but with the new emphasis on complete crossing protection, engineers will be confronted with installing new AFO circuits on the same blocks which already have AFO equipment on a neighboring crossing. If the engineer has opted to use equipment built by the same manufacturer who supplied equipment for the older installations, his job is relatively simple. He can refer to the manufacturer's literature and determine which frequencies are compatible.

An engineer may be confronted with a problem when he has opted to integrate equipment of two different manufacturers. The transmitter frequency or output level of one type of equipment may adversely affect the receiver of the neighboring installation. How does one determine the compatibility of different equipment and the frequencies to be selected?

People

CANADIAN NATIONAL.—**R. S. Stevenson** appointed regional communication systems officer, Great Lakes Region, Toronto.

CENTRAL OF NEW JERSEY.—**E. J. Grady** appointed assistant signal supervisor, Elizabethport, N.J. **Howard Unger** named to the new position of assistant communications and signal design engineer, Newark.

DELAWARE & HUDSON.—**Kenneth Dodge**, assistant to engineer signals & communications, Albany, N.Y., appointed assistant engineer signals and communications.

SOUTHERN.—**W. Vernon Reedy** appointed general supervisor, communications & signals, Atlanta.

SUPPLIERS

D. D. Huffman, manager-engineering, **Union Switch & Signal Division** of WABCO, Pittsburgh, has been promoted to vice president-engineering. **C. H. Mertz**, manager-manufacturing, has been named vice president-manufacturing. **C. F. Wert**, manager-marketing, has been promoted to vice president-marketing.

Carl L. Henricks, former southeastern regional sales manager, **Western-Cullen Division, Federal Sign & Signal Corp.**, has been named executive vice president, **National Railroad Construction Corp.**, Atlanta, Ga. Mr. Henricks will manage the new offices and warehouse space opened for railroad signal installations, surveys, circuit design and engineering for grade crossing protection and warehousing of signal equipment in the Atlanta area. NARCO is a subsidiary of **T. Frederick Jackson, Inc.**, New York, of which **Ronald H. Webster** is president.

Charles E. Webb, Jr., manager, Indianapolis division, **Okonite Co.**, appointed manager, Cincinnati district.

National Electric Control Co., has acquired **G.A.P. Co.** (Gate Arm Products) for the manufacture of grade crossing protection products, including wooden and reinforced fibre-glass gate arms. These products will be manufactured by a newly formed company, **National Electric Gate Co.**

Werner H. Siemens has joined **International Engineering Co., Inc.**, as principal electrical engineer-transportation, San Francisco. Formerly manager of electrification control systems, General Electric's Railroad Electrification Section, Mr. Siemens has had over 20 years of experience in planning, design and construction of train control and communications systems in the United States and Canada.

D. L. Munro has been appointed sales representative and **R. L. Cotterell**, service engineer, **Cardwell Westinghouse Co.**, Chicago.

Paul F. Scheckel has been appointed sales engineer, Central Midwest Area, **Lynch Communication Systems Inc.**, Kansas City, Mo.

Richard S. Rothermel has been appointed senior sales engineer, **GTE Lenkurt, Inc.**, Falls Church, Va.

Dwight H. Cox and **Roy A. March, Jr.**, have been appointed regional sales managers, **RCA Mobile Communications Systems**, at Bridgeton, Mo., and Houston, Tex., respectively.

Donald R. Beall, executive vice president, **Collins Radio Co.**, has been appointed president.

W. Dale Leonard has been appointed manager of common carrier accounts, microwave marketing, Dallas, Tex. He was formerly manager of independent telephone accounts.

M. W. Sheffer, assistant general manager, has been promoted to general manager, utility market, **Graybar Electric Co.**, New York, succeeding **L. J. O'Connell**, retired.

David N. Snyder has been appointed vice president-marketing, **Nife Inc.**, Copiague, N.Y. Mr. Snyder was formerly marketing manager.

T. A. Campobasso, vice president Washington operations, **Collins Radio Co.**, has been named vice president and general manager of the International, Sales and Service Divisions. **Donald J. Yockey** vice president and general manager, Special Telecommunications Systems Division, Newport Beach, Calif., named vice president and general manager of the newly formed Telecommunication Systems Division. Both men will report to **D. R. Beall**, executive vice president.

J. J. Lenehan, vice president of marketing, Microwave Division, Dallas, has been named vice president, Telecommunication Programs, London.

Ron Montgomery, president, **Collins Radio Co. of Canada, Ltd.**, effective March 8, will report to **George W. Sullivan**, vice president and general manager, Telecommunications Equipment Division in Cedar Rapids, Iowa. Mr. Montgomery previously reported to the

vice president and general manager, international operations in Dallas.

Jack F. Underwood has been appointed division vice president, **RCA Mobile Communications Systems,** Meadow Lands, Pa. Mr. Underwood was formerly manager, automatic test equipment programs, RCA Aerospace Systems Division, Burlington, Mass. **David M. Crawford** has been appointed to the newly established position of manager, Product Information Center, RCA Mobile Communications Systems, Meadow Lands. Mr. Crawford was formerly manager, proposal administration. **Samuel P. Vrankovich,** manager, communications products manufacturing, has been appointed plant manager, Meadow Lands facility.

Victor Brinkman has been appointed group manufacturing manager-New England Operations, **Okonite Co. Joseph F. Papson** and **Thomas M. Scanlon** have been appointed plant managers, Ashton, R.I., and Worcester, Mass. plants, respectively.

Ronald M. Peters, general manager, steel operations, **General Cable Corp.,** Greenwich, Conn., has been appointed an operations vice president of the corporation. Mr. Peters retains his title of general manager and his responsibility for operations of Indiana Steel & Wire Co. and Indiana Pressed Steel Co., both in Muncie, Ind.

Michel C. Bergerac, president of **ITT Europe, Inc.,** Brussels, Belgium, has been elected a corporate executive vice president of **International Telephone & Telegraph Corp.**

Raymond J. Gill, group general manager, Illumination & Electrical Products Group, **International Telephone & Telegraph Corp.,** New York, has been appointed group general manager, Semiconductors Worldwide Group, succeeding **Gerald L. Seelig,** now vice president and group executive, Semiconductors, Illumination & Electrical Products & Components Group.

Burton G. Mendelson has joined **Teleprocessing Industries, Inc.,** Mahwah, N.J., as vice president, Corporate Development Division. Since 1966 Mr. Mendelson has served with the Western Union group of companies.

Publications

Ready-to-use calculator programs, including Heat Loss-Heat Gain, Building Peak Solar Heat Gain, Duct Sizing, and Water and Gas Pipe Sizing are described in a new booklet available from Hewlett-Packard. These programs, which can be purchased from HP, were written in cooperation with practicing design engineers.

Calculator Application Summary "HVAC Design with the HP 9810" is available from Hewlett-Packard free of charge. *Hewlett-Packard Co.*

Circle 100 on Reader Service Card

"The Sensible Way to Look at Computers," an eight page brochure available from Data General Corp., explains in non-technical terms how its small computers can be an alternative to traditional methods of solving computing problems. It deals with the total cost, risk, and commitment involved in choosing computers. *Data General.*

Circle 101 on Reader Service Card

An 8-page illustrated catalog covering all environmental enclosures manufactured for X-ray, nuclear, and radio-frequency applications has been issued by Keene Corp.'s Ray Proof Division.

Given in the concise catalog are performance test data and a special section on built-in enclosures; custom designs, RF accessories, penetration, filters and ventilation. *Keene Corp.*

Circle 102 on Reader Service Card

A new 40-page booklet providing a full description of functional operation, engineering considerations, ordering information, installation, alignment, and maintenance procedures for the type 36A Supergroup Equipment is now available from GTE Lenkurt.

The 36A Supergroup Equipment is designed to expand the maximum channel capacity of a type 36A Multiplex System from 72 channels to 180 channels or three supergroups. *GTE Lenkurt, Inc.*

Circle 103 on Reader Service Card

General Electric's TRS-696B common carrier solid state microwave radio in the 5.925 to 6.425 GHz range is described in Brochure ECM-281C. The TRS-696B is "state-of-the-art" equipment adaptable to a variety of common carrier applications. *General Electric Corp.*

Circle 104 on Reader Service Card

A new bulletin describing a complete line of corrosion measurement and control systems is available from Magna Corp.

Among the systems described are digital recording and portable instruments to measure corrosion and pitting tendency in all types of environments. The bulletin also includes descriptions of systems for monitoring, recording and automatically controlling the pH of liquids, total dissolved solids, and control of pH, TDS and corrosion in cooling tower water. *Magna Corp.*

Circle 105 on Reader Service Card

SFIM, of Massy, France, has applied its vast experience of vehicle measurement and identification to a study of certain problems specific to rail traffic.

A brochure has been prepared by SFIM, which describes the CEDRAT, DOPAN, and MALTEC microwave systems in detail.

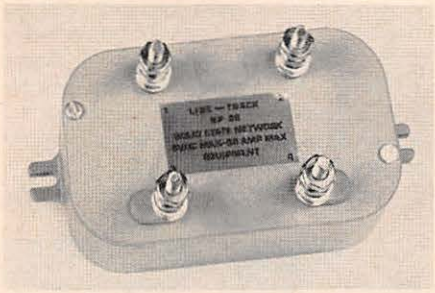
CEDRAT supplies the computer with a doppler frequency corresponding to the speed of the cars over the rail brakes. The output, derived from the differential between the assigned speed and actual speed, can be slaved to control the track brakes. This operation assures automatic adjustment of the speed of the car shunted into the marshalling yard.

DOPAN is used for the detection of obstacles on grade crossings. This system combines several microwave detectors to trigger an alarm circuit if a vehicle is immobilized between the barriers of a grade crossing or if a vehicle crashes into the barriers.

MALTEC accurately measures the length of a train running on a track regardless of speed. The signal can also be used to perform a measurement of speed and acceleration. Several MALTEC systems can be arranged to provide information on the make-up of a train. *SFIM.*

Circle 106 on Reader Service Card

Product News



Surge protection network is for solid state equipment

Another Safetran surge protection network is offered in the series of protection networks. SP26-1 Surge Protection Network is for use on grade crossing predictors, motion sensors and other audio frequency overlay track feed equipment, where the DC track voltage exceeds 1½ VDC up to a limit of 5 VDC. The SP26-1 replaces the SP23-2. Internally the SP26-1 includes surge suppression inductors, a solid state protector (SSP-1-30A) and solid state booster (SSB-1-45). The unit is said to provide for an ultra-fast precision response protection for solid state equipment. The unit ratings are 50 amp max, 5 VDC max, .006 ohm per line DCR, 8 microhenry per line inductance; surge trigger 30 volts; surge current 1,000 amp max; frequency impedance 16 microhenry, 0.1 per 1,000 Hz of applied signal. *Safetran Systems Corp.*

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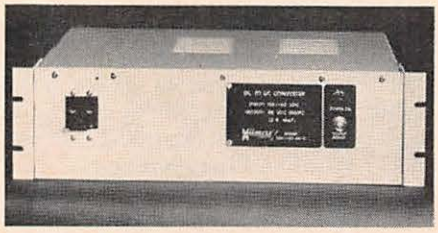

DC-to-DC converters use 125 volt and 48 volt input

Available in twelve rack-mount models representing a wide variety of input/output/power configurations, the Wilmore Series 1240 DC-to-DC converters provide voltage conversion, source-to-load isolation, protection against large input transients, and output voltage regulation.

All twelve models of the series are said to provide a well-regulated well-filtered dc output voltage which is adjustable over a moderate range, approximately 10%, by means of a front-panel lock-screw adjustment. Models are available for the two most commonly encountered station battery inputs of 48 VDC and 125 VDC. Nominal dc outputs are 24 volts, 28 volts, 36 volts, and 48 volts. Standard power output levels are 300 watts and 600 watts. High efficiencies, ranging to greater than 85% for some models, result from the use of nondissipative regulation techniques. All units are rated for continuous duty operation throughout an ambient temperature range of −20 degrees C to 70 degrees C. *Wilmore Electronics Co., Inc.*

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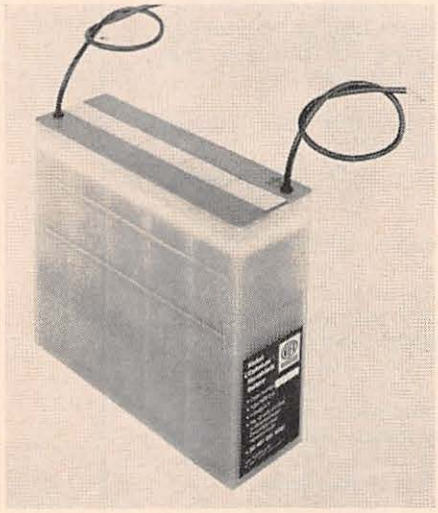

Nickel Cadium battery is good for many applications

A new 6-volt monoblock nickel cadmium storage battery, designed for emergency lighting, communications, and general standby power applications, is now offered by NIFE.

The battery is housed in a translucent plastic container 10¼ in. long, 3½ in. deep, and 9 in. high. Its capacity of 24 ampere-hours provides sufficient power to light a 100 watt lamp for 1½ hours to 87½% of nominal voltage in emergency lighting service. *NIFE Inc.*

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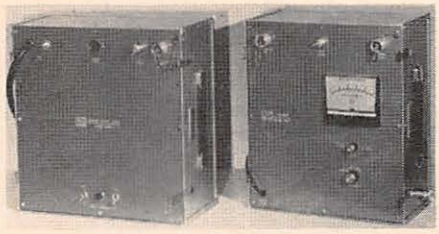

New instrument is designed for cable fault locating

A new compact cable fault locating instrument permits "thumping" of shielded cables used for electrical distribution in plants and other installations having extensive power distribution grids.

This dc high voltage power supply and capacitor discharge (thumper) unit, designated the Model 8605 DC Hypot Thumper, is contained in two aluminum carrying case-cabinets which easily fit into a car trunk.

Powered by a 115 volt, 50/60 Hz source, the Model 8605 employs a 12.5 and 25 KV dc power supply rated at 25 milliamperes for rapid charging of the 0.5 microfarad capacitor. The capacitor provides 150 joules in high setting or 38 joules in low setting which is discharged into the cable under test through an adjustable spark gap.

Flash-over will occur at any fault on the cable creating an audible "pop" at approximately one second intervals. This popping is easily heard when patrolling a long length of cable, thus pinpointing the location of the fault on the shielded cable. *Associated Research Inc.*

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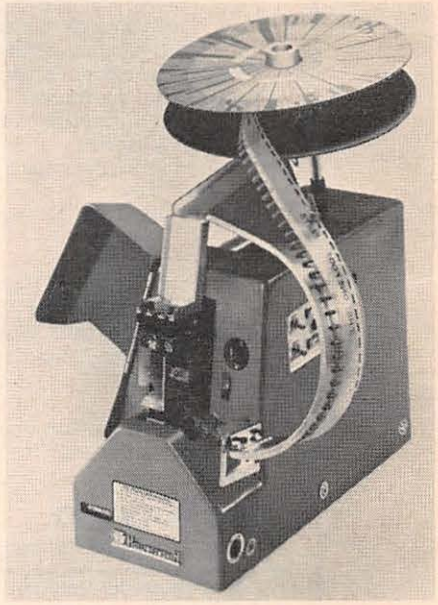

Terminal crimping is made quickly and safely

The automatic terminal crimping machine, Model H270 crimps insulated and non-insulated solderless terminals and butt splices for wire sizes 26-4 AWG. It requires 75-100 psi and operates on 50-60 Hz, 115 VAC.

The H270 can be operated in either the manual or automatic mode at speeds up to 3,600 terminals per hour. To assure quality crimps, dies operate

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*Options include:

1) with dashpot – only first wheel actuates contact which reduces wear.

2) without dashpot – each wheel actuates contact.

B. SILEC DIRECTIONAL CONTACTOR – "FORFEX"

*Mounted on the inside of a rail to detect the passage of the wheels of a train, this contactor has two arms, each arm operating a set of contacts. To sense direction, only the first arm lowered activates its contacts. Each arm lowered has as strong leaf spring to return arm to the normal position after the wheel passes. Dashpot provided, delays return of the arm to is isn't struck fully by every wheel. Contacts: (see options below)

*Options include:

1) Standard with one Form C contact each direction.

2) Both contacts actuated by movement to left only.

3) Both contacts actuated by movement to right only.

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only when the wire is in the proper position. After crimping the H270 indexes to the next terminal on tape and the crimped terminal is automatically ejected.

The H270 accepts reels of terminals bonded to Mylar tape in quantities of 250 to 5,000 depending on the size of terminal. It features double indexing which enables it to meet unusual terminal requirements. *Hollingsworth Soldering Terminal Co.*

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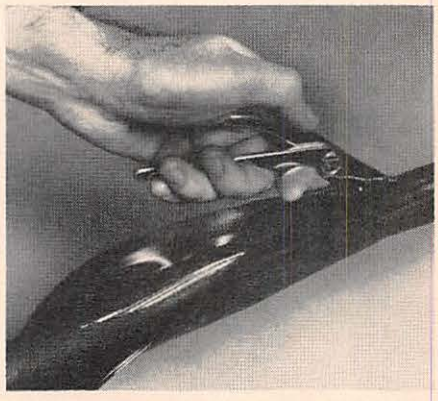

Protective jacketing saves scarce materials

A "zip-on" protective jacketing for cables and wires, Zippertubing, is now available in materials for almost any application including high and low temperatures and shielded as well as standard and special types.

Zippertubing goes on over existing cable insulation for added protection and can often eliminate the need to replace scuffed or worn cables. Smaller wires can be bundled for neater appearance, easier maintenance and yet are readily accessible.

In use, Zippertubing can be applied as a patch or section for special protection in critical areas or as an entire cable duct. A patented zip-on closure trac provides a fast, positive seal with finger pressure. *Zippertubing Co.*

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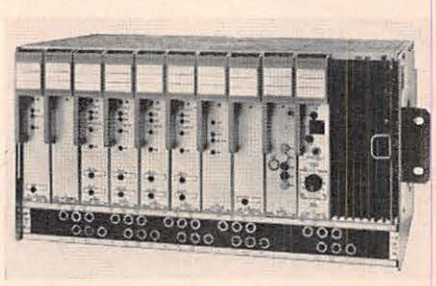

PCM multiplexer combines channels

A new pulse code modulation (PCM) multiplexer unit which combines the bit streams of two or four 24-channel PCM channel banks is for application with microwave radio trans-

mission facilities, for use over T2-type cable routes, and for higher order multiplexing.

Called the type 9120A Digital Multiplexer, the unit combines together through an interleaving process the 1.5 Mb/s representing 24 individual voice or data channels.

When operating in conjunction with GTE Lenkurt's type 78F2 2-GHz Microwave Radio System, the 9120A combines two 24-channel PCM bit streams for transmission. Taking advantage of the inherent cost economies of standard PCM channel bank equipment, such an application is well adapted for extending telephone channels via radio over terrain where cable construction is technically prohibitive or otherwise impractical.

In its radio configuration the 9120A utilizes GTE Lenkurt's modified duobinary technique which processes a 3.2 Mb/s signal in a bandwidth of approximately 1.6 MHz.

A second configuration of the 9120A Digital Multiplexer combines up to four DSX1 lines, each of which represents 24 channels, and interconnects the resultant 96-channel 6.3 Mb/s bit stream with a DSX2 cross-connect point.

The modular digital multiplexer is 8¾ in. high, consumes less than 45 watts and can be operated from either a 24 VDC or 48 VDC power source. *GTE Lenkurt Inc.*

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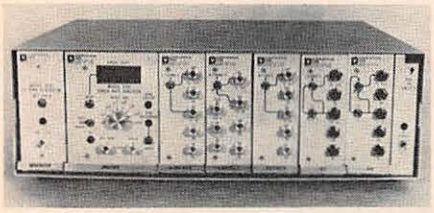

Test set analyzes data communications

The Model 3200 bit error rate analyzer is a modular test set capable of analyzing data communication systems operating at speeds up to 70 megabits per second. The basic test set consists of three modules: a generator, an analyzer and an interface.

The generator module generates a repeating 1,048,575 bit pseudo-random bit sequence at a rate determined by clock timing provided by the interface module. The generated bit pattern is applied to the interface module where the appropriate signal conversion takes place. The analyzer module accepts a repeating pseudo-random bit stream and a timing signal from the active interface and compares this received data with an error-free replica on a bit-by-bit basis. Bit errors or bit error rate is displayed directly on a 4-digit solid state, LED display. Both manual and automatic pattern synchronization is provided. *International Data Sciences, Inc.*

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Wave analyzer displays frequency on digital readout

Single-frequency measurements can be made with the Hewlett-Packard Model 3581A Wave Analyzer. A built-in counter display the tuned frequency with 1 Hz resolution on an LED digital readout. Signal amplitude is read on a four-scale analog meter. Two scales are for log displays of 90 db and 10 db (expanded), and the other two are linear with 1 or 3 full scale.

Some uses for the Model 3581A include harmonic analysis, fm and phase noise measurements of high-frequency signals, and analysis of power lines for control signaling and carrier current voice channels. Very low frequency applications include evaluation of sonar devices and low frequency radio transmission systems.

A communications version, Model 3581C, is designed for analysis of telephone voice channels, both single and up to 12 multiplexed. It can also be used to pinpoint interference on data channels, look for spurious tones, and analyze levels of transmitted tones. *Hewlett-Packard Co.*

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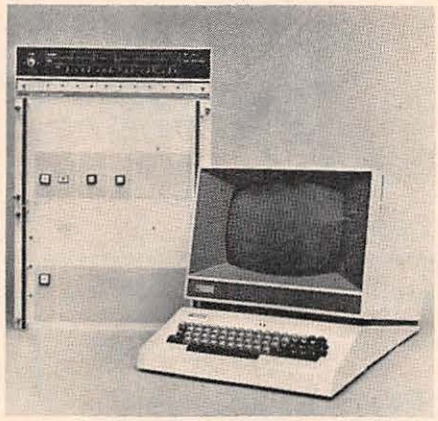

New graphic display built for Data General computers

The 6500 Graphic Display System is available with as many as sixteen inde-

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RAILROAD OPERATION AND RAILWAY SIGNALING: The basic text which explains the relationship between train operation and railway signaling is now available in reprint form. The text is in the form of questions and answers so that the reader may know the objective of the information given, and to place emphasis upon the "why" and "how" of railway signaling and railroad operation.

Topics covered include fixed signals, block signaling, interlockings, centralized traffic control, cab signals and highway grade crossing protection. This is a reprint of the 1953 edition of RAILROAD OPERATION AND RAILWAY SIGNALING by Edmund J. Phillips, Jr., Simmons-Boardman Publishing Corp., 350 Broadway, New York, N.Y. 10013. Softbound. Price: 1 to 9 copies at $5.95 each; 10 or more copies at $5.00 each. To obtain copies, please fill out the coupon and send check or money order along with your order.

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pendently operating terminals displaying up to four-thousand characters each. The graphic CRT display system features a 512 by 512 point matrix which permits alphanumeric or graphic images. The image on each display is stored in a dedicated portion of a centrally located refresh memory, equivalent to 32K bytes of storage per terminal. Available with full color capability, the 6500 system can plot continuous or discontinuous functions, complex figures, bar graphs, histograms and annotated graphs. Data can be written light on a dark background or dark on a light background with alphanumeric characters or graphic points positioned anywhere on the screen. *Data Disc, Inc.*

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Portable test set made for microwave application

The CE-6 Communications Monitor is a portable test set for microwave radio installation and maintenance which will measure RF frequency, RF and IF sensitivity, FM deviation, and audio frequency response on 790 to 960 MHz microwave radio transmitters and receivers. Since many measurements are made at oscillator frequencies, which may be several times lower than the operation frequency, the test set is said to be useful at 2 GHz or higher bands. *Cushman Electronics, Inc.*

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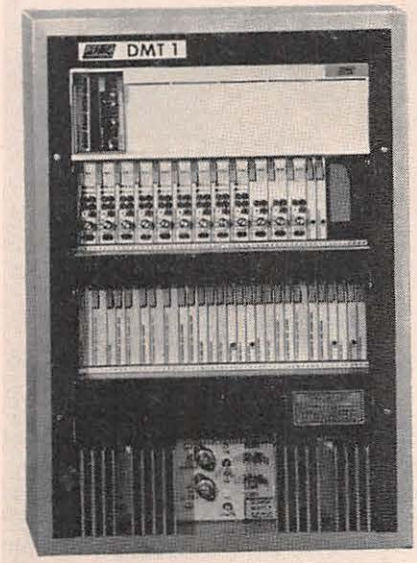

TDM multiplex designed for data transmission

A TDM multiplex for transmission of up to 24 PCM voice circuits or data groups over T1 span lines or T1 compatible microwave has been made available by Canadian Marconi Co. The DMT1 operates in both terminal and regenerative drop-and-insert repeater configurations. Any number of voice and/or data circuits can be dropped at DMT1 drop-and-insert repeaters without impairing on-going traffic. Ongoing time slots left vacant by dropped circuits can be reused by newly inserted voice and data traffic. Any DMT1 voice-channel time slot can be replaced by a data group with each data group capable of carrying a flexible mixture of synchronous and asynchronous data up to 48 kbps or one 50 kbps data circuit. *Canadian Marconi Co.*

Circle 118 on Reader Service Card

Touch-Tone encoding pad designed for portable radios

A new Touch-Tone encoder in a miniaturized package has been announced by Bramco Controls. Model ME47P was designed primarily for use with hand held portable radios. It is adaptable to other Touch-Tone applications also.

The encoding pad allows placement of phone calls, or access repeater stations from a hand held radio. The standard LED equipped model provides a visual feedback of the tone transmission. An optional model with audible feedback through the radio speaker is also available. The unit can be mounted on any radio operating on 6-14 VDC. *Bramco Controls.*

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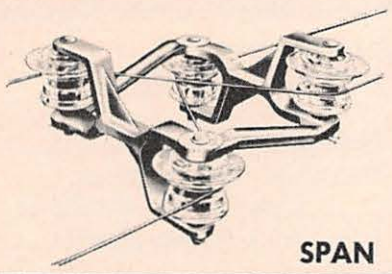
45 of the 52 Class 1 Railroads in the U.S.A. & Canada Specify & Use CASE TRANSPOSITION BRACKETS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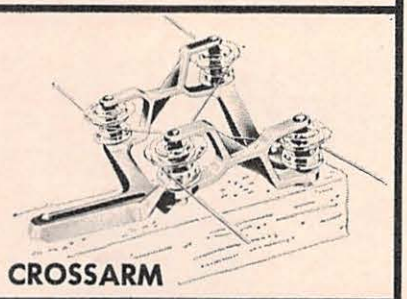
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Multi-station systems possible with control console

A new eight channel control console designed for multi-station systems is now available. Model T1617AM comes with tone control, DC control or both. Touch-tone signaling is standard with tone and DC control.

The unit is all solid-state and provides complete control of up to eight base stations or repeaters from a central desk. Parallel operation of any or all of the stations in the system are possible from as many as six different dispatch points. *Motorola Communications & Electronics Inc.*

Circle 120 on Reader Service Card

Priority for crossing safety

(Continued from page 12)

Magnitude of Problem

Altogether there are approximately 223,000 public rail-highway grade crossings in the United States. In 1972, the Department of Transportation, in a report to Congress, recommended that a 10-year program be initiated at an annual cost of about $75 million to improve safety installations at a total of 30,000 crossings, where accident rates have been highest. Congress, in passing the Highway Act of 1973, responded to this recommendation by providing the new sources of funds for crossing safety projects described in this article. The amount of money authorized is not huge, considering the magnitude of the overall job to be done and the fact that the money must be spread over the entire country. But it represents landmark changes in Federal policy by recognizing more emphatically than ever that crossing safety is a public responsibility and that Highway Trust Fund money should be made available to help local communities throughout the country solve crossing safety problems.

The enthusiasm with which local and state officials respond in planning and implementing rail-highway crossing programs may well determine the future scope of these programs.

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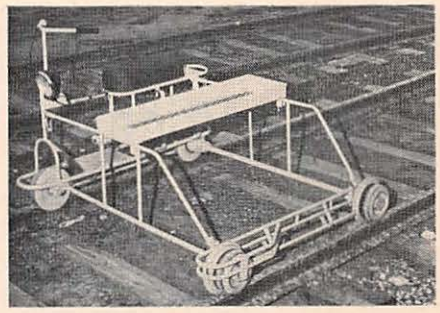

The **RAIL TECH-A.R.C. TRACKSCOOT** is a rugged, field proven, self-propelled means of mobility for day or night maintenance and inspection. It consists of a power frame and rail wheels, a folding, pin-connected outrigger assembly with rail wheels, and a detachable tool box support frame. Gross loads of up to 700 pounds are comfortably carried.

A 4 H.P. 4-cycle engine (with 12 volt alternator for lights) powers the **TRACKSCOOT** to a maximum speed of 15 mph.

Both rear wheels drive and brake from live axles and a horizontal drive shaft which forms the lower chord of the rear outrigger truss.

Assembly and disassembly are simple and rapid. The three compact components can be carried in the trunk of an automobile or light truck. Removal from rail is a quick, easy one man operation.

Over one half of the net weight of the unit is in the rail wheels. Approximately 90% of the net weight of 190 lbs. is less than 10 inches above the rail. This results in a low center of gravity which enhances **TRACKSCOOT** safety.

TRACKSCOOTS have been used successfully for many years and are praised by track, bridge, signal and communication men from coast to coast. U.S. Patent no. 2,424,106; Great Britain Patent no. 1,177,896.

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Editor's corner

Automatic car identification brings mixed reactions

For four days, over 300 delegates to the Fourth International Symposium on Railway Cybernetics in Washington explored the uses and misuses of cybernetics. During the presentation of 63 papers that ranged from areas covering research to actual installations, a great deal of discussion was centered around accuracy of data input. As Al Perlman, president of Western Pacific, put it, "Garbage in, garbage out." He went on to say, "We must use computers only for the people who need the output. The user must say what he needs! Don't go by what the 'computer experts' say. Apply computers only when results will be profitable and evident. In other words use common sense."

Some criticism about automatic car identification brought some mixed reactions from a number of delegates. The old problem of 'dirty labels' was felt to be the major factor preventing international acceptance of the electronic system for identification of rolling stock. The readability of labels was said to be about 81% accurate for some of the users. In response to this figure, R. C. Schoppert, Director Management Services of ACI Systems Corp., made a call to Norfolk & Western Vice President R. F. Dunlap and quoted him as saying "All of our aci installations have been cost justifiable." Schoppert went on to say that Sealand Corp. has been using the aci system with readability running at about 99.4%. In response to Schoppert, L. A. Brophy, Vice President of Chicago Railroad Terminal Information System Inc. said, "Just like any other weak link in the chain, we must upgrade maintenance of labels and improve this figure of 81%." J. Dekempeneer from the Belgian National Railway stated that their manual system of data input had only one error in 20,000. This figure raised some hot discussion. Perlman wanted to know how such accuracy was accomplished when some studies in the U.S. indicate manual input to be only about 75% accurate. Dekempeneer explained that with Belgium's system, double checks are made to confirm the number, and the fact that fewer numbers are used on cars decreases the chance for error.

Although some of the delegates remained undecided about the use of aci for a means of accurate data input, most agreed that its development should be continued and that refinements in the system look promising.

Would readers of RSC care to comment on their experiences with automatic car identification systems? Have your experiences been good or bad? What steps has your railroad taken to improve the system? Concerning label maintenance: Has your railroad implemented the procedures as stated by the AAR effective Jan. 1, 1973, where rules have been outlined in section 3.1.1.1 through 3.1.1.5?

New standards for AFO

A number of verbal comments have been received about the paper by Klaus Frielinghaus titled "Tradeoffs in the Design of Audio Frequency Track Circuits" which appeared in April RSC. There seems to be some controversy about some of the points brought up by Mr. Frielinghaus. If readers would like to offer written comments, we will be glad—as always—to consider them for publication.

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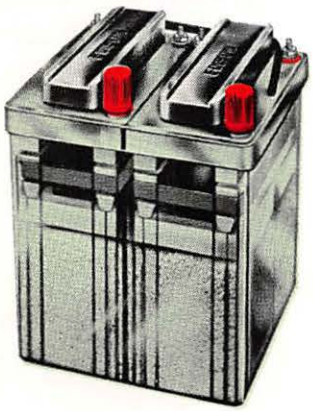

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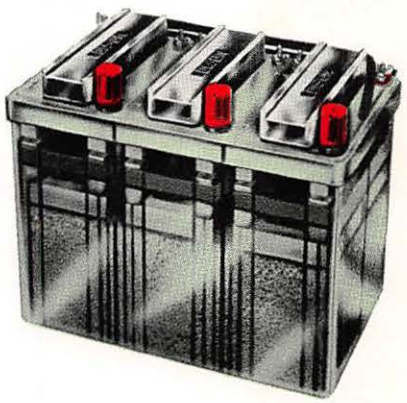

■ Depending on the type of battery and the connections made (series or parallel), the normal voltages are 1.25, 2.5 or 3.75 volts; and capacities are 1,100, 2,200 or 3,300 ampere-hours.

■ Maximum recommended continuous currents range from .500 amp. to 3.75 amps. depending on the type of battery, battery connections and operating temperature.

For complete details, just write us at any of the addresses below.

McGRAW-EDISON COMPANY
Edison Battery Division • Bloomfield, N.J. 07003

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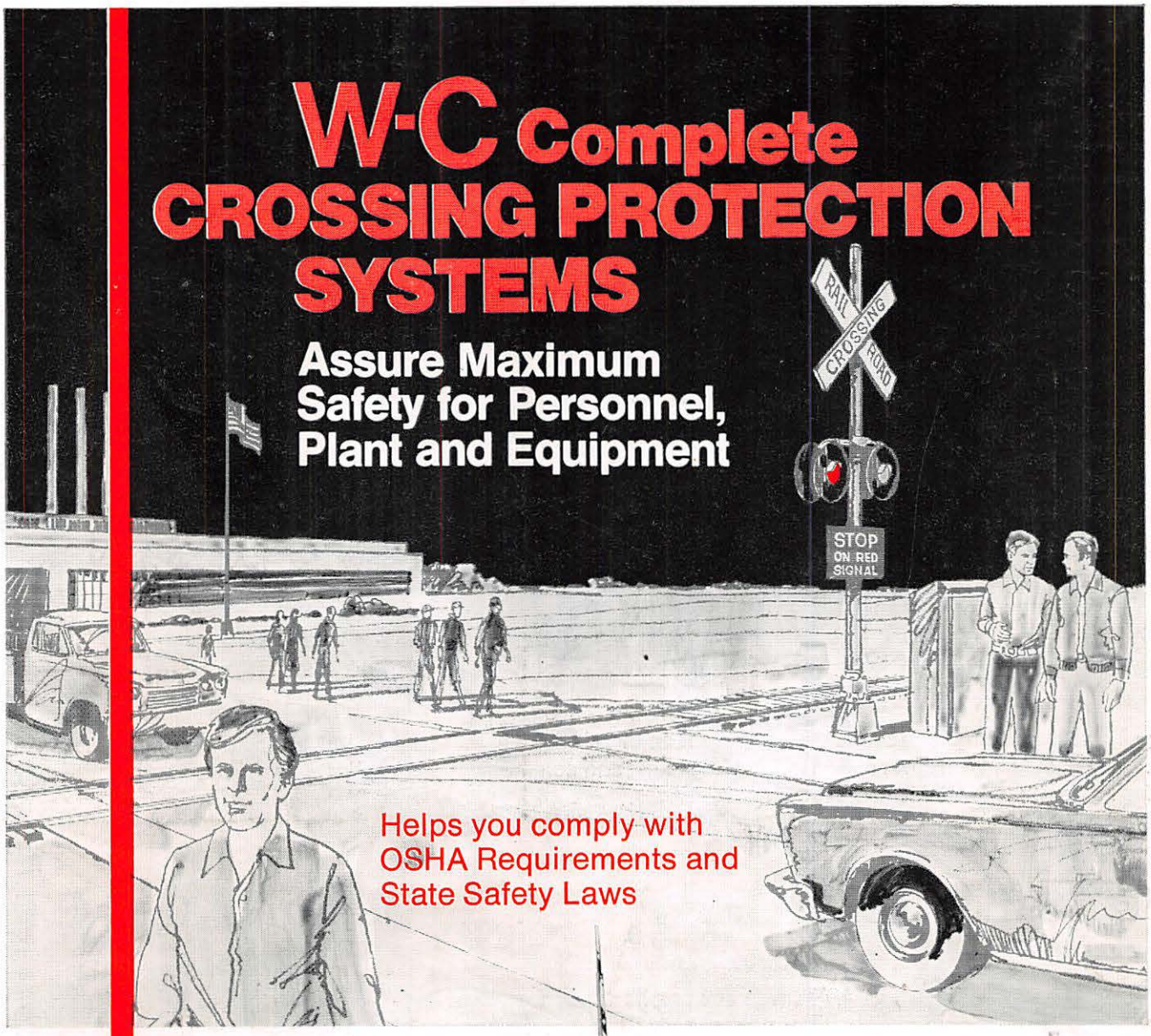

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Western-Cullen Products and Services can be tailored to solve almost any rail-highway crossing problem and comply with government agency requirements.

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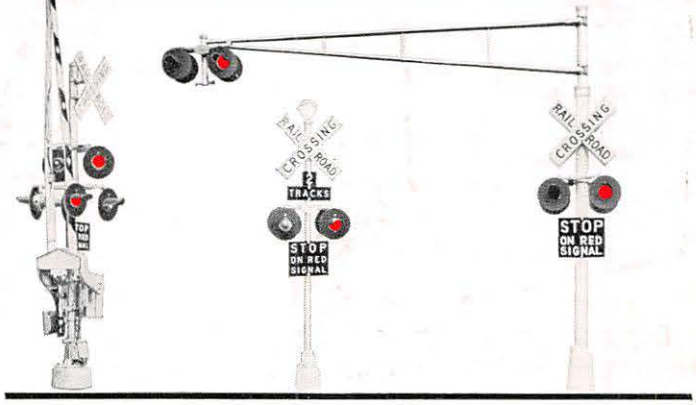

MODEL 10 CROSSING GATE

STANDARD A-479 FLASHING LIGHT SIGNAL

A760 TYPE CANTILEVER SIGNAL

WESTERN-CULLEN DIVISION

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